

Linux based 3G Multimedia Mobile-phone

API Specification

[AP Framework]

Draft 1.0

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Preface

This document describes an API specification of AP framework for Linux based 3G multimedia mobile-phone. This document is the results of the work of the CE Linux Forum's technical working group. The APIs in this document are based on the technology which is originally the collaborative work by NEC Corporation, Panasonic Mobile Communication Ltd., and NTT DoCoMo, Inc.

1. MSB

1.1 Generating an Object

Void msb_Object_Create ()

[Argument]

| Argument | Type | I/O | Description |
|----------|------------------|-----|---|
| Self | MsbObject * | O | Local object |
| ObjID | MsbObjectID | I | Local object ID |
| Attr | MsbObjectAttr * | I | Local object attribute |
| Argc | int | I | Number of start parameters |
| Argv | char** | I | Start parameter |
| Ev | MsbEnvironment * | O | Area where returned exception is stored |

[Return value]

| Type | Content |
|------|---------|
| Void | |

[Header file]

msb/msb.h

[Function]

Generates an object. When an object is generated, it is added to the system.

[Remarks]

- Be sure to use this function with object execution processing as a pair.
- If the same object ID is already generated, it is overwritten for addition.
- Use the value uniquely defined in the system for object ID.
- Do not copy the object generated by this function. Use the pointer to refer to the entity if required.
- If local object attribute is not set, set the local object attribute to null.
- For the values that can be set for object attribute, see Section 4.1.19, "Generating an Object Attribute."
- Set the fifth argument of the above function so that a socket descriptor can be passed as follows:
 - divertSocket socket-ID (character string)
 - *Make the above socket ID a character string of decimal or hexadecimal values.
- Set the second and fifth arguments of the above function so that the object ID of argv can be used to generate multiple MSB objects from the start script as follows:
 - Second argument (ObjID)
 - Specify the index (0 origin) of the object ID (character string) after objID option (see the explanation of the fifth argument).

- Fifth argument (argv)
 - objID object ID1 (character string 1) object ID2 (character string 2)
 - *Make the above object ID a character string of decimal or hexadecimal values.
 - Use example
- Start script
- ```
/usr/local/./appA --objID XXX YYY ZZZ
```
- \*In the above processing procedure, when i = 0, MSB object for XXX is generated.  
When i = 1, MSB object for YYY is generated. When i = 2, MSB object for ZZZ is generated.

## 1.2 Destroying an Object

### **Void msb\_Object\_Destroy ()**

#### [Argument]

| Argument | Type             | I/O | Description                             |
|----------|------------------|-----|-----------------------------------------|
| Self     | MsbObject *      | I   | Local object                            |
| Ev       | MsbEnvironment * | O   | Area where returned exception is stored |

#### [Return value]

| Type | Content |
|------|---------|
| Void |         |

#### [Header file]

msb/msb.h

#### [Function]

Destroys an object. When an object is destroyed, it is deleted from the system.

#### [Remarks]

- Be sure to use this function with object generation processing as a pair.
- Use this function from only task (thread) that generated the object to be deleted.

### 1.3 Executing an Object

#### **Void msb\_Object\_Run ()**

[Argument]

| Argument | Type             | I/O | Description                             |
|----------|------------------|-----|-----------------------------------------|
| Self     | MsbObject *      | I   | Local object                            |
| Ev       | MsbEnvironment * | O   | Area where returned exception is stored |

[Return value]

| Type | Content |
|------|---------|
| Void |         |

[Header file]

msb/msb.h

[Function]

Executes a local object (main loop).

[Remarks]

- Be sure to use this function with object generation processing as a pair.
- This function enables double execution of object (nested loop).



## 1.4 Generating an Object (Coexistence with GTK+)

**Void msb\_gtk\_init ()**

## [Argument]

| Argument | Type             | I/O | Description                             |
|----------|------------------|-----|-----------------------------------------|
| Self     | MsbObject *      | I   | Local object                            |
| ObjID    | MsbObjectID      | I   | Local object ID                         |
| Attr     | MsbObjectAttr *  | I   | Local object attribute                  |
| Argc     | int              | I   | Number of start parameters              |
| Argv     | char**           | I   | Start parameter                         |
| Ev       | MsbEnvironment * | O   | Area where returned exception is stored |

## [Return value]

| Type | Content |
|------|---------|
| Void |         |

## [Header file]

msb/msb\_gtk.h

## [Function]

Generates an object and executes GTK+ initialization processing (gtk\_init function). When an object is generated, it is added to the system.

## [Remarks]

- To make GTK+ and MSB exist together, use this function.
- Use the value uniquely defined in the system for an object ID.
- If the same object ID is already generated, it is overwritten for addition.
- Be sure to use this function with object execution processing (coexistence with GTK+) as a pair.
- If local object attribute is not set, set the local object attribute to null.
- The values that can be set for object attribute are same as those for the msb\_Object\_Create function that generates an object.

## 1.5 Destroying an Object (Coexistence with GTK+)

**Void msb\_gtk\_quit ()**

## [Argument]

| Argument | Type             | I/O | Description                             |
|----------|------------------|-----|-----------------------------------------|
| Self     | MsbObject *      | I   | Local object                            |
| Ev       | MsbEnvironment * | O   | Area where returned exception is stored |

## [Return value]

| Type | Content |
|------|---------|
| Void |         |

## [Header file]

msb/msb\_gtk.h

## [Function]

Destroys an object and executes GTK+ quit processing. When an object is destroyed, it is deleted from the system.

## [Remarks]

- To make GTK+ and MSB exist together, use this function.
- Be sure to use this function with object generation processing (coexistence with GTK+) as a pair.
- Use this function from only task (thread) that generated the object to be deleted.

## 1.6 Executing an Object (Coexistence with GTK+)

### Void msb\_gtk\_main ()

#### [Argument]

| Argument | Type             | I/O | Description                             |
|----------|------------------|-----|-----------------------------------------|
| Self     | MsbObject *      | I   | Local object                            |
| Ev       | MsbEnvironment * | O   | Area where returned exception is stored |

#### [Return value]

| Type | Content |
|------|---------|
| Void |         |

#### [Header file]

msb/msb\_gtk.h

#### [Function]

Executes a local object and executes GTK+ execution processing (gtk\_main function).

#### [Remarks]

- To make GTK+ and MSB exist together, use this function.
- Be sure to use this function with object generation processing (coexistence with GTK+) as a pair.

## 1.7 Comparing an Object

### **MsbBool msb\_Object\_Equals ()**

#### [Argument]

| Argument | Type             | I/O | Description                             |
|----------|------------------|-----|-----------------------------------------|
| Obj1     | MsbObject *      | I   | Comparison target object 1              |
| Obj2     | MsbObject *      | I   | Comparison target object 2              |
| Ev       | MsbEnvironment * | O   | Area where returned exception is stored |

#### [Return value]

| Type    | Content                               |
|---------|---------------------------------------|
| MsbBool | MSB_TRUE (same)/MSB_FALSE (different) |

#### [Header file]

msb/msb.h

#### [Function]

Compares the specified object and returns the result.

#### [Remark]

- None

## 1.8 Acquiring an Object ID

**MsbInt msb\_Object\_Get\_ID ()**

## [Argument]

| Argument | Type             | I/O | Description                             |
|----------|------------------|-----|-----------------------------------------|
| Obj      | MsbObject *      | I   | Object                                  |
| Ev       | MsbEnvironment * | O   | Area where returned exception is stored |

## [Return value]

| Type   | Content   |
|--------|-----------|
| MsbInt | Object ID |

## [Header file]

msb/msb.h

## [Function]

Returns the object ID of the specified object. The object ID that has been specified to generate an object is returned.

## [Remarks]

- This function is provided for compatibility with Application Controller(APC), and is not usually used from the application.
- The object ID that can be acquired by this function depends on whether compile option (XINDPANA\_MSB) is specified.
  - If the compile option is specified:  
Object ID defined in <wm/apliddef.h>
  - If the compile option is not specified:  
Object ID for MSB management that is only used inside MSB

## 1.9 Acquiring File Descriptor for Object

```
int msb_Object_Get_Socket()
```

### [Argument]

| Argument | Type             | I/O | Description                             |
|----------|------------------|-----|-----------------------------------------|
| Obj      | MsbObject *      | I   | Object                                  |
| Ev       | MsbEnvironment * | O   | Area where returned exception is stored |

### [Return value]

| Type | Content         |
|------|-----------------|
| Int  | File descriptor |

### [Header file]

msb/msb.h

### [Function]

Returns the file descriptor of the specified object. The descriptor to be returned is a unique value.

### [Remark]

- None

## 1.10 Receiving an MSB Event

**Void msb\_Object\_Recv\_Event ()**

## [Argument]

| Argument | Type             | I/O | Argument                                |
|----------|------------------|-----|-----------------------------------------|
| Obj      | MsbObject *      | I   | Object                                  |
| Ev       | MsbEnvironment * | O   | Area where returned exception is stored |

## [Return value]

| Type | Content |
|------|---------|
| Void |         |

## [Header file]

msb/msb.h

## [Function]

This function is called when an MSB event is received. This function executes reception processing for lower-layer communication for server.

## [Remarks]

- Be sure to use this function with object generation processing as a pair.
- The application that calls this function need not call the msb\_Object\_Run function.

## 1.11 Generating an Object Attribute

**Void msb\_Object\_Attr\_Create ()**

## [Argument]

| Argument | Type             | I/O | Description                             |
|----------|------------------|-----|-----------------------------------------|
| Attr     | MsbObjectAttr *  | O   | Local object attribute                  |
| Ev       | MsbEnvironment * | O   | Area where returned exception is stored |

## [Return value]

| Type | Content |
|------|---------|
| Void |         |

## [Header file]

msb/msb.h

## [Function]

Initializes object attribute information of a local object.

## [Remarks]

- Be sure to use this function before object generation processing.
- If an object attribute is not to be set, this function need not be called.
- Details of object attributes are as follows:

```
typedef struct _MsbObjectAttr{
 MsbObject* parent; /*(1)Pointer to parent object*/
 void* display; /*(2)Pointer to display to be added*/
 MsbInt wID; /*(3)Window ID to be added*/
 -
 -
 void* handleEvtFunc;
 /*(4)Event handling processing function to be added*/
 void* handleEvtAfterFunc;
 /*(5)Event handling postprocessing function to be added*/
 void* handleEvtData;
 /*(6)User data for event handling processing*/
 void* handleEvtAfterData;
 /*(7)User data for event handling postprocessing*/
 MsbShort eventNum; /*(8)Number of events to be added*/
 MsbShort myObject; /*(9)Communication method for local object to be added*/
 -
}MsbObjectAttr;
```

## (1)Pointer to parent object

Specify this item to create multiple objects in a task.

The display ID and window ID used by a child object are the same as those



for the parent object.

(2)Pointer to display to be added

Specify this item to use the display created by the application to create an object. Display specification can be added for coexistence with X-Window. In this case, the application enables event reception processing other than used by MSB. If only GTK and MSB objects exist, display is not specified.

(3)Window ID to be added

Specify this item to use the window created by the application to create an object. The window ID must be specified for coexistence with X-Window. In this case, the application enables event reception processing other than used by MSB. If only GTK and MSB objects exist, the window ID is not specified.

(4)Event handling processing function to be added

Add the event handling processing function.

This function can be added separately from the callback function to be added by using the `msb_Bind` function. This processing function can handle all events, and can also handle more events than the maximum number of events in an object.

The event handling processing function is executed for all events. If the event ID is the same as that for the `msb_Bind` function, the callback function added using the `msb_Bind` function is executed. However, if the return value from the event handling processing function is `MSB_TRUE`, the callback function is not executed.

(5)Event handling postprocessing function to be added

Add the event handling postprocessing function.

This function can be added separately from the callback function to be added by using the `msb_BindAfter` function. This postprocessing function can handle all events, and can also handle more events than the maximum number of events in an object.

The event handling postprocessing function is executed for all events. If the event ID is the same as that for the `msb_BindAfter` function, the callback postprocessing function added using the `msb_BindAfter` function is executed.

However, if the return value from the event handling postprocessing function is `MSB_TRUE`, the callback postprocessing function is not executed.

(6)User data for event handling processing

Add user data to be passed when the event handling processing function added in above item (4) is called.

(7)User data for event handling postprocessing

Add user data to be passed when the event handling postprocessing function added in above item (5) is called.

(8)Number of events to be added

Specify the number of events to be added to an object. By default, system-defined value (`MSB_OBJECT_EVT_TABLE_MAX`) is adopted. The maximum number of events in an object is the above system-defined value.

(9)Communication method for local object in asynchronous communication mode

Specify the communication method for the object (local object) on the same

process.

- The types of event handler processing function (and postprocessing function) are shown below. (Xxx...subsystem name)

MsbBool XxxHandleEvent

```
(MsbObject* client, /* Source object */
 MsbObject* server, /* Local object */
 MsbLong lengthSend, /* Send data size */
 void* sendData, /* Pointer to send data */
 MsbLong lengthRecv, /* Receive data size */
 void* recvData, /* Pointer to receive data */
 void* data /* User data */
 MsbEventID eventID, /* Event ID */
 MsbEnvironment * ev /* Area where returned exception is stored */
)
```

- If user data is not specified, specify null.
- The following communication methods for local object are specified:

**MSB\_FUNCALL\_DIRECT:** Function call is used. Inter-process communication does not take place.

**MSB\_FUNCALL\_PROTOCOL:** Inter-process communication is used.

## 1.12 Initializing an Environment Variable

### **Void msb\_Environment\_Create ()**

#### [Argument]

| Argument | Type             | I/O | Description                                                             |
|----------|------------------|-----|-------------------------------------------------------------------------|
| Ev       | MsbEnvironment * | O   | Area where environment variable information to be initialized is stored |

#### [Return value]

| Type | Content |
|------|---------|
| Void |         |

#### [Header file]

msb/msb.h

#### [Function]

Initializes environment variable information.

#### [Remark]

If an MsbEnvironment type instance is generated, this function must be used to initialize the instance area.

## 1.13 Acquiring a Local Object

**Void msb\_Object\_GetSelf ()**

## [Argument]

| Argument | Type             | I/O | Description                             |
|----------|------------------|-----|-----------------------------------------|
| ObjID    | MsbObjectID      | I   | Local object ID                         |
| Self     | MsbObject**      | O   | Local object                            |
| Ev       | MsbEnvironment * | O   | Area where returned exception is stored |

## [Return value]

| Type | Content |
|------|---------|
| Void |         |

## [Header file]

msb/msb.h

## [Function]

Outputs the pointer to the local object generated using the msb\_Object\_Create or msb\_gtk\_init function.

## [Remarks]

- Use the object ID defined in <wm/apliddef.h> for the object ID to be specified in the first argument of this function.

## 1.14 Acquiring an Object According to Object ID

**Void msb\_Object\_GetObjByID()**

## [Argument]

| Argument | Type             | I/O | Description                             |
|----------|------------------|-----|-----------------------------------------|
| Self     | MsbObject *      | I   | Local object                            |
| ObjID    | MsbObjectID      | I   | Object ID of object to be acquired      |
| Target   | MsbObject *      | O   | Object to be acquired                   |
| Ev       | MsbEnvironment * | O   | Area where returned exception is stored |

## [Return value]

| Type | Content |
|------|---------|
| Void |         |

## [Header file]

msb/msb.h

## [Function]

Uses an object ID as key to acquire the corresponding object.

## [Remarks]

- This function is provided for Application Controller (APC), and is not used by the application.
- The object acquired using this function can be specified in the first argument (local object) of the communication function.
- The object ID to be specified in the second argument of this function varies, depending on whether the compile option (XINDPANA\_MSB) is specified.
  - If the compile option is specified:  
Object ID defined in <wm/apliddef.h>
  - If the compile option is not specified  
Object ID for MSB management that is only used in MSB

## 1.15 Receiving Specified Event Name

|                                      |
|--------------------------------------|
| <b>void msb_RecvSpecificEvent( )</b> |
|--------------------------------------|

## [Argument]

| Argument    | Type            | I/O | Description                                         |
|-------------|-----------------|-----|-----------------------------------------------------|
| Self        | MsbObject*      | I   | Local object                                        |
| Attr        | MsbFuncAttr *   | I   | Communication attribute                             |
| EvID        | MsbEventID      | I   | Event ID                                            |
| RecvDataLen | MsbLong         | I   | Length of data to be received                       |
| RecvData    | void *          | O   | Pointer to area where data to be received is stored |
| Usrdata     | void **         | O   | Address of user data                                |
| Ev          | MsbEnvironment* | O   | Area where returned exception is stored             |

## [Return value]

| Type | Content |
|------|---------|
| Void |         |

## [Header file]

&lt;msb/msb.h&gt;

## [Function]

This API is called to receive only the specified event. If the specified event is notified, received data and user data are stored without calling the callback function and control is returned from the function.

## [Remarks]

- If the data is the specified event, RecvData (or send data set in the client side) and Usrdata are assigned to the arguments and returned.

\*Usrdata: The address of user data added using the msb\_Bind function is stored.

- The unspecified event remains in the event management queue as is (outstanding).

- **The event sender shall use asynchronous communication. If synchronous communication is used, response is not returned and the sender is locked.**

## 1.16 Message Queue Processing

**Void msb\_Exec\_Queue\_Events ()**

## [Argument]

| Argument | Type             | I/O | Description                             |
|----------|------------------|-----|-----------------------------------------|
| Self     | MsbObject *      | I   | Local object                            |
| Ev       | MsbEnvironment * | O   | Area where returned exception is stored |

## [Return value]

| Type | Content |
|------|---------|
| Void |         |

## [Header file]

msb/msb.h

## [Function]

Processes the MSB message queue event.

## [Remarks]

- The application that uses the msb\_Object\_Recv\_Event function shall use this function.
- The application that uses msb\_Object\_Recv\_Event shall be used immediately before select is issued.

## 1.17 Object X Event Handler Macro (Coexistence with X-Window)

**Void msb\_Object\_Proc\_XEvent ()**

## [Argument]

| Argument | Type             | I/O | Description                             |
|----------|------------------|-----|-----------------------------------------|
| Server   | MsbObject *      | I   | Local object                            |
| Event    | MsbEvent *       | I   | Received event                          |
| Ev       | MsbEnvironment * | O   | Area where returned exception is stored |

## [Return value]

| Type | Content |
|------|---------|
| Void |         |

## [Header file]

msb/msb.h

## [Function]

Processes the MSB-related event of the X events received using the XnextEvent function.

## [Remarks]

- Use this function only if the X-Window application requires X event processing specific to the application (if GUI is required).
- Do not use this function with the msb\_Object\_Run function.
- This macro can be used only if the compile option (XINDPANA\_MSB) is not specified.



## 1.18 Macro that Executes an Object (Exclusive to WM that Coexists with X-Window)

### **Void msb\_Object\_XRun ()**

- If the compile option (XINDPANA\_MSB) is specified

#### [Argument]

| Argument | Type             | I/O | Description                             |
|----------|------------------|-----|-----------------------------------------|
| Obj      | MsbObject *      | I   | Local object                            |
| Ev       | MsbEnvironment * | O   | Area where returned exception is stored |

- If the compile option is not specified

#### [Argument]

| Argument | Type             | I/O | Description                             |
|----------|------------------|-----|-----------------------------------------|
| Obj      | MsbObject *      | I   | Local object                            |
| Attr     | MsbObjectAttr *  | I   | Local object attribute                  |
| Ev       | MsbEnvironment * | O   | Area where returned exception is stored |

#### [Return value]

| Type | Content |
|------|---------|
| Void |         |

#### [Header file]

msb/msb.h

#### [Function]

Executes the main loop of the local object.  
Processes main loop for X application (WM).

#### [Remarks]

- Be sure to use this function with object generation processing as a pair.
- This function is exclusively provided for WM in socket MSB, and shall not usually be used from the application.

## 1.19 Transmission and Response Reception (Synchronous Communication)

**Void msb\_FuncCall()**

## [Argument]

| Argument   | Type             | I/O | Description                                         |
|------------|------------------|-----|-----------------------------------------------------|
| Self       | MsbObjcet *      | I   | Local object (client)                               |
| Server     | MsbObjcet *      | I   | Server                                              |
| EventID    | MsbEventID       | I   | Event ID                                            |
| LengthSend | MsbLong          | I   | Length of data to be transmitted                    |
| ArgSend    | void *           | I   | Pointer to data to be transmitted                   |
| LengthRecv | MsbLong          | I   | Length of data to be received                       |
| ArgRecv    | void *           | O   | Pointer to area where data to be received is stored |
| Attr       | MsbFuncAttr *    | I   | Communication attribute                             |
| Ev         | MsbEnvironment * | O   | Area where returned exception is stored             |

## [Return value]

| Type | Content |
|------|---------|
| Void |         |

## [Header file]

msb/msb.h

## [Function]

Transfers the argument that calls a function from the client to the server, and receives the result of executing the function from the server.

When this function is called, data pointed to by ArgSend is transferred to the server and passed to the server program. Data generated by the server program is copied to the area pointed to by the pointer ArgRecv and transferred to the client, and the function returns.

Data pointed to by ArgSend is only transferred up to the length in LengthSend. Usually, the structure size is assigned to this argument. ArgRecv only receives data up to the length in LengthRecv. Usually, the structure size is assigned to this argument.

## [Remarks]

- Use the object generated using the msb\_Object\_Create or msb\_gtk\_init function or the object acquired using the msb\_Object\_GetSelf function for Self (local object) in the first argument.
- Use the value uniquely defined (<msb/msb.h>) in the system for event ID.
- If synchronous communication is continuously performed, MSB processing may not catch up with communication, which keeps the sender waiting (example: 100 communications for one second). In such case, keeping the sender waiting is restricted.
- If the communication attribute is not used, enter null.
- The following values can be set in the communication attribute:
  - MsbInt timeOutInterval (msec)

Set the time-out time for interrupting synchronous communication when no data is returned from the server even if a certain time is exceeded during synchronous communication.

- MsbCancelFunc func

Set user-defined cancel processing. When user-defined cancel processing is set, synchronous communication can be canceled without waiting for return from the server during synchronous communication by receiving the event defined in user-defined cancel processing.

The type of user-defined cancel processing function is as follows:

```
Bool (*MsbCancelFunc)(XEvent *event,void *data);
```

[Restriction]

If an event for the object with the parent-child relationship other than the MSB object that has called the `msb_RecvSpecificEvent` function comes, the `msb_FuncCall` function shall not be called in the callback processing.

## 1.20 Transmission and Response Reception (Asynchronous Communication)

**Void msb\_AsyncFuncCall()**

## [Argument]

| Argument   | Type             | I/O | Description                             |
|------------|------------------|-----|-----------------------------------------|
| Self       | MsbObjcet *      | I   | Local object (client)                   |
| Server     | MsbObjcet *      | I   | Server                                  |
| EventID    | MsbEventID       | I   | Event ID                                |
| LengthSend | MsbLong          | I   | Length of data to be transmitted        |
| ArgSend    | void *           | I   | Pointer to data to be transmitted       |
| Ev         | MsbEnvironment * | O   | Area where returned exception is stored |

## [Return value]

| Type | Content |
|------|---------|
| Void |         |

## [Header file]

msb/msb.h

## [Function]

Provides the communication method in which the client restarts operation without waiting for the server to terminate during transmission and response reception. Other processing is the same as that for transmission and response reception.

## [Remarks]

- Use the object generated using the msb\_Object\_Create or msb\_gtk\_init function or the object acquired using the msb\_Object\_GetSelf function for Self (local object) in the first argument.
- Use the value defined uniquely (<msb/msb.h>) in the system for event ID.
- When asynchronous communication is continuously performed, MSB processing may not catch up with communication, which keeps the sender waiting (example: 100 communications for one second). In such case, keeping the sender waiting is restricted.

## 1.21 Communication Attribute Generation

**Void msb\_Object\_FuncAttrCreate ()**

## [Argument]

| Argument | Type             | I/O | Description                             |
|----------|------------------|-----|-----------------------------------------|
| Attr     | MsbFuncAttr *    | I   | Communication attribute                 |
| Ev       | MsbEnvironment * | O   | Area where returned exception is stored |

## [Return value]

| Type | Content |
|------|---------|
| Void |         |

## [Header file]

msb/msb.h

## [Function]

Initializes communication attribute information.

## [Remarks]

- Use this function with transmission and response reception (synchronous communication) as a set.
- If communication attribute is not set, this function need not be called.
- The type of communication attribute is as follows:

```
typedef struct _MsbFuncAttr{
 MsbCancelFunc func; /*Cancel determination function*/
 MsbInt timeOutInterval; /*Time-out value (msec)*/
 void *data; /*User data*/
}MsbFuncAttr;
```

- For details about communication attribute, see Section 4.2.1, "Transmission and Response Reception (Synchronous Communication)."

## 1.22 Adding Server Callback Function

**Void msb\_Bind ()**

## [Argument]

| Argument | Type             | I/O | Description                                          |
|----------|------------------|-----|------------------------------------------------------|
| Self     | MsbObject *      | I   | Local object                                         |
| EventID  | MsbEventID       | I   | Event ID                                             |
| Func     | MsbFunc          | I   | Pointer to function (callback function) to be added  |
| Data     | void *           | I   | User data to be passed when added function is called |
| Ev       | MsbEnvironment * | O   | Area where returned exception is stored              |

## [Return value]

| Type | Content |
|------|---------|
| Void |         |

## [Header file]

msb/msb.h

## [Function]

Adds the server callback function.

## [Remarks]

- Use the value defined uniquely (<msb/msb.h>) in the system for event ID.
- The type of callback function to be added is as follows: (Xxx...subsystem name, Yyy...optional)  
void XxxYyy(MsbObject \*client,MsbObject \*server,  
void \*sendData,void \*recvData,void \*data,MsbEnvironment \*ev)
- When user data is not specified, specify null.
- When the callback function is already added for a certain event, it is overwritten.

## 1.23 Adding Callback Function for Server Postprocessing

**Void msb\_BindAfter()**

## [Argument]

| Argument | Type             | I/O | Description                                          |
|----------|------------------|-----|------------------------------------------------------|
| Self     | MsbObject *      | I   | Local object                                         |
| EventID  | MsbEventID       | I   | Event ID                                             |
| Func     | MsbFunc          | I   | Pointer to function (callback function) to be added  |
| Data     | void *           | I   | User data to be passed when added function is called |
| Ev       | MsbEnvironment * | O   | Area where returned exception is stored              |

## [Return value]

| Type | Content |
|------|---------|
| Void |         |

## [Header file]

msb/msb.h

## [Function]

Adds the callback function for server postprocessing. The callback function for postprocessing is usually processed after the added callback function is called and synchronous communication and asynchronous communication terminate. This function is usually used to prevent processing of the added callback function from occupying the client context for an extensive during of time (since the client contents is occupied until there is retrun from the server).

## [Remarks]

- Use the value defined uniquely (<msb/msb.h>) in the system for event ID.
- One callback function for postprocessing is available for one event.
- The type of callback function to be added is the same as that of server msb\_Bind function.
- When user data is not specified, specify null.
- Null is passed to the fourth argument (void \*recvData) of the callback function for postprocessing.

## 1.24 Deleting Server Callback Function

**Void msb\_Unbind ()**

## [Argument]

| Argument | Type             | I/O | Description                             |
|----------|------------------|-----|-----------------------------------------|
| Self     | MsbObject *      | I   | Local object                            |
| EventID  | MsbEventID       | I   | Event ID                                |
| Ev       | MsbEnvironment * | O   | Area where returned exception is stored |

## [Return value]

| Type | Content |
|------|---------|
| Void |         |

## [Header file]

msb/msb.h

## [Function]

Deletes the server callback function.

## [Remarks]

- The callback function for postprocessing is also deleted.
- This function shall be used from only the task (thread) that has added the function to be deleted.



## 1.25 Forward Name Resolution

**Void msb\_Resolve()**

## [Argument]

| Argument | Type             | I/O | Description                             |
|----------|------------------|-----|-----------------------------------------|
| Self     | MsbObject *      | I   | Local object                            |
| ObjID    | MsbObjectID      | I   | Name resolution target object ID        |
| Target   | MsbObject *      | O   | Name resolution target object           |
| Ev       | MsbEnvironment * | O   | Area where returned exception is stored |

## [Return value]

| Type | Content |
|------|---------|
| Void | None    |

## [Header file]

msb/msb.h

## [Function]

Acquires the name resolution target object from the name resolution target object ID.

## [Remark]

- The name resolution target object acquired using this function shall not be used for the first argument (local object) of the object communication function `msb_FuncCall` or `msb_AsyncFuncCall`.

## 1.26 Reverse Name Resolution

**Void msb\_ReverseResolve()**

### [Argument]

| Argument | Type             | I/O | Description                             |
|----------|------------------|-----|-----------------------------------------|
| Self     | MsbObject *      | I   | Local object                            |
| Target   | MsbObject *      | I   | Name resolution target object           |
| ObjID    | MsbObjectID*     | O   | Name resolution target object ID        |
| Ev       | MsbEnvironment * | O   | Area where returned exception is stored |

### [Return value]

| Type | Content |
|------|---------|
| Void | None    |

### [Header file]

msb/msb.h

### [Function]

Acquires the object ID of name resolution target object.

### [Remark]

- None

## 1.27 Accesses major code of environment variable

### **MSB\_ENV\_MAJOR()**

#### [Argument]

| Argument | Type             | I/O | Description                             |
|----------|------------------|-----|-----------------------------------------|
| Ev       | MsbEnvironment * | O   | Area where returned exception is stored |

#### [Return value]

| Type | Content |
|------|---------|
| Void | None    |

#### [Header file]

msb/msb.h

#### [Function]

Accesses major code of environment variable

#### [Remark]

- None

## 1.28 Access minor code of environment variable

### **MSB\_ENV\_MINOR()**

#### [Argument]

| Argument | Type             | I/O | Description                             |
|----------|------------------|-----|-----------------------------------------|
| Ev       | MsbEnvironment * | O   | Area where returned exception is stored |

#### [Return value]

| Type | Content |
|------|---------|
| Void | None    |

#### [Header file]

msb/msb.h

#### [Function]

Access minor code of environment variable

#### [Remark]

- None

## 2. PICTograph display library

### 2.1 Initializes and adds PICT icon data area

**pct\_CreateSysFx**

#### Overview

Adds the system location-fixed PICT to the PICT icon data area.

#### Format

```
short pct_CreateSysFx(
 PctlIconArea* pctArea,
 MsbObject* self,
 unsigned short type
);
```

#### Argument

**pctArea** [O]: PICT icon data area  
**self** [I]: Client communication object  
**type** [I]: System location-fixed PICT type (see “List of PICT Server Defined Values [Separate Volume]”)

#### Return values

**PCT\_OK** : Normal  
**PCT\_ERR** : Error

#### Description

[Normal processing]

- System location-fixed PICT icon information specified in type is added to pctArea.
- The system location-fixed icon type being currently used is specified for type.

[Abnormal processing]

- If PICT server communication information cannot be acquired because the PICT server is not started before this API function is executed, this API function returns an error. In this case, pctArea is not initialized.
- If the value not defined in the “List of PICT Server Defined Values [Separate Volume]” is specified for type, this API function returns an error. The fixed PICT is not added.
- If pctArea that has been added to the PICT server is specified, this API function returns an error. One pctArea corresponds to one icon display area on the PICT server.
- If an unused system location-fixed icon type is specified for type, this API function returns an error.

#### Notes

- This API function does not display image. When image is to be displayed, this API function must be used to add fixed PICT to the PICT icon data area, and then the pct\_ActionOn function must be executed to light image or the pct\_ActionBlink function must be executed to blink image.

- If initialized pctArea that has not been added to the PICT server is specified, this API function adds system location-fixed PICT that can be added with the specified parameter.

## 2.2 Initialize PICT control option

pct\_ActionOptionInit

### Overview

Initialize PICT control option data.

### Format

```
short pct_ActionOptionInit(
 PctActionOption *option
);
```

### Argument

**option**      [O]: PICT control option area

### Return values

**PCT\_OK**    : Normal

**PCT\_ERR** : Error

### Description

[Normal processing]

- PICT control option is initialized.
- The PctActionOption structure is used as PICT control option.
- When this API function is called, PICT control option is initialized to the following initial values:

PICT type = PCT\_TYPE\_NORMAL

PICT control level = PCT\_ACTION\_LEVEL2

[Abnormal processing]

- If the specified option is null, this API function returns an error.

### Note

None

## 2.3 Lights an icon

pct\_ActionOn

### Overview

Lights image in the icon display area.

### Format

```
short pct_ActionOn (
 PctlIconArea* pctArea,
 unsigned short imageId,
 PctActionOption *option
);
```

### Arguments

|                |                               |
|----------------|-------------------------------|
| <b>pctArea</b> | [I]: PICT icon data area      |
| <b>imageId</b> | [I]: Icon image number        |
| <b>option</b>  | [I]: PICT control option area |

### Return values

|                |          |
|----------------|----------|
| <b>PCT_OK</b>  | : Normal |
| <b>PCT_ERR</b> | : Error  |

### Description

[Normal processing]

- If pctArea and imageId that have been added to the icon display area are specified, the specified image is lit in the specified icon display area (if other competitive PICT display request is not issued to the icon display area for the specified image).
- The icon image ID described in the “List of PICT Server Defined Values [Separate Volume]” is specified for imageId.
- After the pct\_ActionOptionInit function is used for initialization, control level shall be specified for option.
  - If only PICT display request at the same or lower control level is issued to the icon display area for the specified image, the specified image is lit in the icon window. In this case, all competitive PICT display requests are on standby and are not displayed in the icon window. (The PICT display request waiting to be displayed is queued in the PICT server application.)
- In the following cases in (1) and (2), the specified image is not lit in the icon window but waits to be displayed.
  - (1) If PICT display request at higher control level is issued to the icon display area for the specified image
    - > When the icon is shut off or destroyed, the PICT server application executes display determination processing in response to the competitive PICT display request. As a result, if no competitive PICT display request exists, the specified image is lit in the icon window.
  - (2) If batch lighting or batch blinking is in progress
    - > When batch lighting or batch blinking is canceled, the PICT server application

executes display determination processing. As a result, if no competitive PICT display request exists, the specified image is lit in the icon window.

- If system location-fixed PICT of the same type is specified from the same application, the PICT display request is overwritten regardless of control level or control method (lighting/blinking).

(ex.1) If application A issues a battery PICT lighting request while application A issues a battery PICT blinking request, the blinking request is overwritten to become the lighting request.

(ex.2) If application A issues a battery PICT (imageId=2) lighting request while application A issues a battery PICT (imageId=1) lighting request, the lighting request (imageId=1) is overwritten to become the lighting request (imageId=2).

#### [Abnormal processing]

- If the specified pctArea is not added to the icon display area, an error is returned without affecting PICT icon display status.
- If the value that is greater than the number of images added to the specified icon display area or a value of 0 or smaller is specified for imageId, an error is returned without affecting PICT icon display status.

#### Note

Supplementary information about display operation if the PICT width occupies multiple areas is given.

If there are icon display areas 1 to 3, icons A, B, and C at control level that is lower than that of icon D are not displayed while icon D at higher control level occupying three areas 1 to 3 is displayed (see Fig. 1).

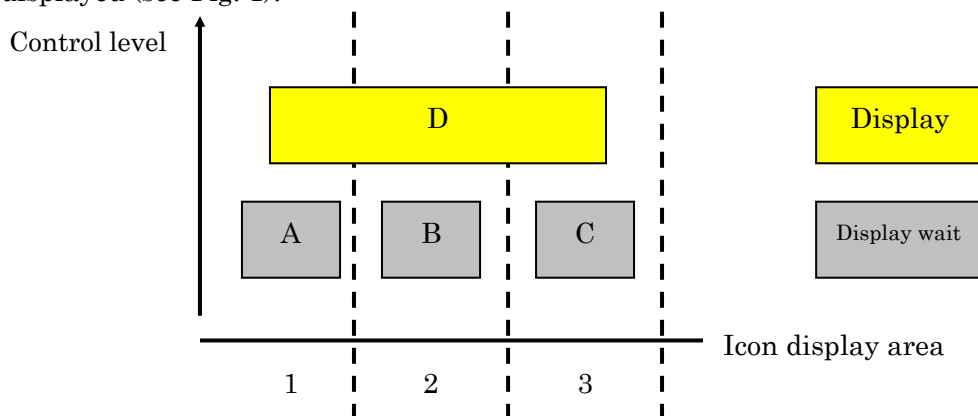


Fig. 1: If there are icon display areas 1 to 3

Assume the case where the following four icons exist:

- (1) Icon D that occupies three areas 1 to 3
- (2) Icon B that occupies area 2 at control level that is higher than that of icon D
- (3) Icon A that occupies area 1 at control level that is lower than that of icon D
- (4) Icon C that occupies area 3 at control level that is lower than that of icon D

In this case, since the control level of icon B that overlaps icon D is higher than that of icon D, icon D is not displayed but icons A, B, and C are displayed (see Fig. 2).



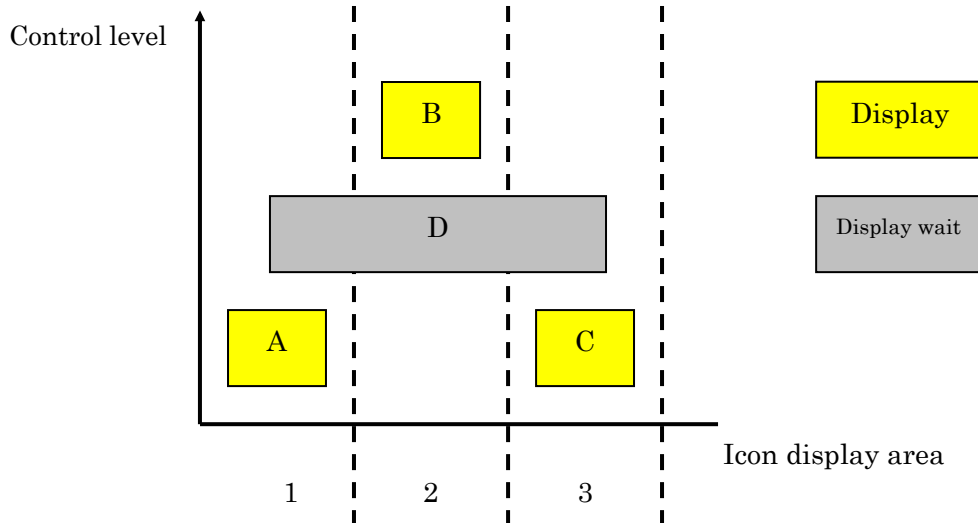


Fig. 2 If four icons exist

Assume the case where the following five icons exist:

- (1) Icon E that occupies two areas 1 and 2
- (2) Icon F that occupies two area 2 and 3 at control level that is lower than that of icon E
- (3) Icon A that occupies area 1 at control level that is lower than that of icon F
- (4) Icon B that occupies area 2 at control level that is lower than that of icon F
- (5) Icon C that occupies area 3 at control level that is lower than that of icon F

In this case, since the control level of icon E that overlaps icon F is higher than that of icon F, icon F is not displayed but icons C and F are displayed (see Fig. 3).

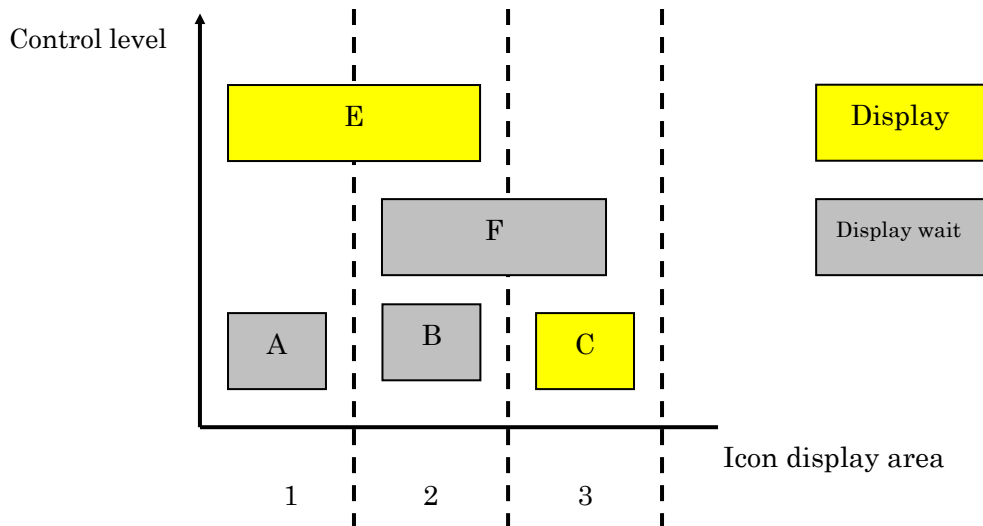


Fig. 3 If five icons exist

## 2.4 Shut off an icon `pct_ActionOff`

`pct_ActionOff`

### Overview

Shuts off the image in the icon display area.

### Format

```
short pct_ActionOff (
 PctlIconArea* pctArea
);
```

### Argument

**pctArea**     [I]: PICT icon data area

### Return values

**PCT\_OK**     : Normal  
**PCT\_ERR**    : Error

### Description

[Normal processing]

- If `pctArea` that has been added to the icon display area is specified, the relevant icon display area is shut off. (If a request to display PICT to be shut off waits to be displayed, the display request is canceled.)
- If this API function is executed for the PICT icon that is blinking the image, the PICT icon being blinked is shut off. (If a request to display PICT to be shut off waits to be displayed, the display request is canceled.)

[Abnormal processing]

- If the specified `pctArea` is not added to the icon display area, an error is returned without affecting the PICT icon display status.
- If the display status is already shut-off status before this API function is called, an error is returned.

### Note

None

## 2.5 Blink an icon

pct\_ActionBlink

### Overview

Blinks the image in the icon display area.

### Format

```
short pct_ActionBlink (
 PctlIconArea* pctArea,
 unsigned short imageId,
 unsigned short blinkMode,
 PctActionOption *option
);
```

### Argument

**pctArea** [I]: PICT icon data area  
**imageId** [I]: Icon image number  
**blinkMode** [I]: Blinking period (0.5 second to 10 seconds: increments of 0.5 second)  
PCT\_INTERVAL\_500 to PCT\_INTERVAL\_10000  
**option** [I]: PICT control option area

### Return values

**PCT\_OK** : Normal  
**PCT\_ERR** : Error

### Description

[Normal processing]

- If pctArea and imageId that have been added to the icon display area are specified, the specified image is blinked in the specified icon display area (if other competitive PICT display request is not issued to the icon display area for the specified image).
- The icon image ID described in the “List of PICT Server Defined Values [Separate Volume]” is specified for imageId.
- The blinking period described in the “List of PICT Server Defined Values [Separate Volume]” is specified for blinkMode.
- The control level shall be set for option after the pct\_ActionOptionInit function is used for initialization.
- If only PICT display request at the same or lower control level is issued to the icon display area for the specified image, the specified image blinked lit in the icon window. In this case, all competitive PICT display requests are on standby and are not displayed in the icon window. (The PICT display request waiting to be displayed is queued in the PICT server application.)
- In the following cases in (1) and (2), the specified image is not blinked in the icon window but waits to be displayed.
  - (1) If PICT display request at higher control level is issued to the icon display area for the specified image
  - > When the icon is shut off or destroyed, the PICT server application executes display

determination processing in response to the competitive PICT display request. As a result, if no competitive PICT display request exists, the specified image is blinked in the icon window.

(2) If batch lighting or batch blinking is in progress

-> When batch lighting or batch blinking is canceled, the PICT server application executes display determination processing. As a result, if no competitive PICT display request exists, the specified image is blinked in the icon window.

- If system location-fixed PICT of the same type is specified from the same application, the PICT display request is overwritten regardless of control level or control method (lighting/blinking).

(ex.1) If application A issues a battery PICT lighting request while application A issues a battery PICT blinking request, the lighting request is overwritten to become the blinking request.

(ex.2) If application A issues a battery PICT (imageId=2) blinking request while application A issues a battery PICT blinking (imageId=1) request, the blinking request (imageId=1) is overwritten to become the blinking request (imageId=2).

[Abnormal processing]

- If the specified pctArea has not been added to the icon display area, an error is returned without affecting the PICT icon display status.
- If the value that is greater than the number of images added to the specified icon display area or a value of 0 or smaller is specified for imageId, an error is returned without affecting PICT icon display status.
- If the specified blinking period is the value other than the blinking period described in the “List of PICT Server Defined Values [Separate Volume],” an error is returned without affecting PICT icon display status.

**Note**

See “Note” of the pct\_ActionOn function.

## 2.6 Destroy an icon

### pct\_Destroy

#### Overview

Destroys the PICT icon.

#### Format

```
short pct_Destroy (
 PctlIconArea* pctArea
);
```

#### Argument

**pctArea**            [I]: PICT icon data area

#### Return values

**PCT\_OK**            : Normal

**PCT\_ERR**           : Error

#### Description

[Normal processing]

- The PICT icon added to the PICT server is destroyed and the corresponding pctArea is placed in the non-initialized state.
- If the PICT icon to be destroyed is lit, it is shut off then destroyed.
- If the PICT icon to be destroyed is blinked, blinking is stopped and the icon is shut off and then destroyed.
- If pctArea that has not been added to the PICT server is specified, the specified pctArea is placed in the non-initialized state.
- If the PICT display request for the PICT icon to be destroyed exists, the PICT server destroys the PICT icon.

[Abnormal processing]

- If an error occurs during communication with the PICT server, the error is returned without changing the contents of pctArea.

#### Note

None

## 2.7 Acquires icon display status

pct\_IconStatusGet

### Overview

Acquires PICT icon display status (lit/blinked/shut-off).

### Format

```
short pct_IconStatusGet (
 MsbObject *from ,
 unsigned short icontype,
 unsigned short imageId
);
```

### Arguments

**from** [I]: Initialized MSB object  
**icontype** [I]: Icon type  
**imageId** [I]: Icon ID

### Return value

**PCT\_ERR** : Error  
**PCTAREA\_IMG\_NO** : Not added  
**PCTAREA\_IMG\_ON** : Added – lit status  
**PCTAREA\_IMG\_BLINK** : Added – blinked status (other than 3-second interval)  
**PCTAREA\_IMG\_BLINK\_3SEC** : Added – blinked status (3-second interval)  
**PCTAREA\_IMG\_OFF** : Added – shut-off status

### Description

[Normal processing]

- This function shall be called with the icon type of the icon whose status is to be acquired specified for icontype.
- The icon type described in the “List of PICT Server Defined Values [Separate Volume]” is specified for icontype.
- This function shall be called with the icon type of the icon whose status is to be acquired specified for imageId.
- The icon ID described in the “List of PICT Server Defined Values [Separate Volume]” is specified for imageId.
- If PCTAREA\_IMG\_NO(=0) is specified for imageId, the status of the area where the icon type specified for icontype is displayed is returned.
- If the specified imageId icon that belongs to the specified icontype is added to the icon display area and is lit, the added – lit status (PCTAREA\_IMG\_ON) is returned.
- If the specified imageId icon that belongs to the specified icontype is added to the icon display area and is blinked at other than the 3.0-second intervals, the added – blinked status (PCTAREA\_IMG\_BLINK) is returned.
- If the specified imageId icon that belongs to the specified icontype is added to the icon display area and is blinked at the 3.0-second intervals, the added – blinked status (PCTAREA\_IMG\_BLINK\_3SEC) is returned.

- If the specified imageId icon that belongs to the specified icontype is added to the icon display area and is shut off, the added – shut-off status (PCTAREA\_IMG\_OFF) is returned.

[Abnormal processing]

- If the specified icontype is the value other than the icon type described in the “List of PICT Server Defined Values [Separate Volume],” an error (PCT\_ERR) is returned without affecting the PICT icon display status.
- If the specified imageId is other than the icon ID described in the “List of PICT Server Defined Values [Separate Volume],” an error (PCT\_ERR) is returned without affecting the PICT icon display status.
- If the specified icontype has not been added to the icon display area, an error (PCT\_ERR) is returned.

**Notes**

- During batch control (batch lighting and batch blinking), the return value of this function and the display status on the actual device may differ.  
Ex.: If all icons are blinked or shut off repeatedly due to low-voltage alarm
- The icon display status acquired using this function is the status of front LCD status display icon. The back LCD icon status cannot be acquired. Therefore, if the back LCD icon type is specified for icontype, the corresponding front LCD icon display status is returned. Thus, side button lock icon and manner mode icon status cannot be acquired.

## 2.8 Batch PICT lighting control command

pct\_GroupActionOn

### Overview

Exercises batch lighting command for multiple fixed PICTs defined by the system.

### Format

```
short pct_GroupActionOn (
 MsbObject *from
);
```

### Argument

**from**        [I]: Initialized MSB object

### Return values

**PCT\_OK**        : Normal

**PCT\_ERR**       : Error

### Description

[Normal processing]

- The generated local MSB object is specified for from.
  - When the PICT server receives the batch lighting control command, all icons described in “Note” are lit.
  - The PICT server executes batch lighting on a priority basis regardless of whether the status is lighting or blinking.
  - The PICT server also gives priority to the subsequent batch lighting command during batch blinking. (In this case, the previous batch blinking command is destroyed.)
  - Even if the PICT server receives a PICT display request during batch lighting, the icon display status is not affected. (The PICT display request received by the PICT server is only queued.)
  - When the PICT server receives batch command cancellation, all icons being batch-lit are shut off. The PICT to be displayed is then determined and all icons to be displayed are displayed in the icon window.



[Abnormal processing]

- If PICT server communication information cannot be acquired because the PICT server is not started before this API function is executed, an error is returned.
- If the specified icon display area for the icon described in “Note” is not added to the icon display area, an error is returned.

## 2.9 Batch PICT blinking control command

### pct\_GroupActionBlink

#### Overview

Exercises batch blinking control for multiple fixed PICTs defined by the system.

#### Format

```
short pct_GroupActionBlink (
 MsbObject *from,
 unsigned short blinkMode
);
```

#### Arguments

**from** [I]: Initialized MSB object

**blinkMode** [I]: Blinking period (0.5 second to 10 seconds: increments of 0.5 second)  
PCT\_INTERVAL\_500 to PCT\_INTERVAL\_10000

#### Return values

**PCT\_OK** : Normal

**PCT\_ERR** : Error

#### Description

[Normal processing]

- The generated local MSB object is specified for from.
- The blinking period described in the “List of PICT Server Defined Values [Separate Volume]” is specified for blinkMode.
- When the PICT server receives the batch blinking control command, all icons described in “Note” are blinked.
- The PICT server executes batch blinking on a priority basis regardless of whether the status is lighting or blinking.
- The PICT server also gives priority to the subsequent batch blinking command during batch lighting. (In this case, the previous batch lighting command is destroyed.)
- Even if the PICT server receives a PICT display request during batch blinking, the icon display status is not affected. (The PICT display request received by the PICT server is only queued.)
- When the PICT server receives batch command cancellation, all icons being batch-blinked are shut off. The PICT to be displayed is then determined and all icons to be displayed are displayed in the icon window.

[Abnormal processing]

- If PICT server communication information cannot be acquired because the PICT server is not started before this API function is executed, an error is returned.
- If the specified blinking period is other than the blinking period described in the “List of PICT Server Defined Values [Separate Volume],” an error is returned.
- If the specified icon display area for the icon described in “Note” is not added to the icon display area, an error is returned.

**Note**

- The icon to be displayed for batch control is the same as for `pct_GroupActionOn`.

## 2.10 Batch PICT shut-off control command

pct\_GroupActionOff

### Overview

Deletes all icons in response to all-icon deletion or cancels batch control (cancels lighting/cancels blinking) for multiple fixed PICTs defined by the system.

### Format

```
short pct_GroupActionOff (
 MsbObject *from,
 unsigned short allIconOff
);
```

### Arguments

**from** [I]: Initialized MSB object

**allIconOff** [I]: All-icon deletion request  
               PCT\_ALLOFF\_REQ (all-icon deletion request)  
               PCT\_ALLOFF\_NO\_REQ (no all-icon deletion request)

### Return values

**PCT\_OK** : Normal

**PCT\_ERR**: Error

### Description

[Normal processing]

- The generated local MSB object is specified for from.
- If PCT\_ALLOFF\_NO\_REQ is set for allIconOff, all PICTs under batch control (lit/blinking) are deleted.
- If PCT\_ALLOFF\_NO\_REQ is set for allIconOff, the icon to be displayed is determined from all-PICT display request data (including PICT display request received during batch control) saved in the queue and display control (lighting/blinking) is exercised.
- If PCT\_ALLOFF\_REQ is set for allIconOff, all PICTs being displayed are deleted.

[Abnormal processing]

- If PICT server communication information cannot be acquired because the PICT server is not started before this API function is executed, an error is returned.
- If PCT\_ALLOFF\_NO\_REQ is set for allIconOff and the PICT server is not executing batch control, an error is returned.

### Notes

- An MSB object shall be generated before this API function is called. (The msb\_gtk\_init and msb\_Object\_Create functions can be used to generate an MSB object.)
- If PCT\_ALLOFF\_NO\_REQ is set for allIconOff, the pct\_GroupActionOn or pct\_GroupActionBlink function shall be used to exercise batch control before this API function is called.

- PCT\_ALLOFF\_REQ can be set for allIconOff for only waiting application.  
PCT\_ALLOFF\_NO\_REQ shall be set for allIconOff for other than waiting application.

## 2.11 Sets icon window background color

pct\_SetBackgroundColor

### Overview

Sets the icon window background color.

### Format

```
short pct_SetBackgroundColor (
 unsigned short lcdId,
 unsigned short winId,
 PctWindowColor* color,
 MsbObject *self
);
```

### Arguments

**lcdId** [I]: Display specification ID

**winId** [I]: ID of icon window whose background color is set (currently, fixed to PCT\_ID\_ICON\_WIN\_1)

**color** [I]: Background color

```
type struct PctWindowColor {
 unsigned long pixel;
 unsigned short red;
 unsigned short green;
 unsigned short blue;
};
```

\*Set 0 for “unsigned long pixel” since it is not referenced.

**self** [I]: Initialized client communication object

### Return values

**PCT\_OK** : Normal

**PCT\_ERR** : Error

### Description

[Normal processing]

- The generated local MSB object is specified for self.
- The opaque background of icon window is changed to the specified background color.
- The LCD icon window background color is set for the value in lcdId as follows:  
 lcdId : PCT\_LCD\_MAIN -> Set front LCD icon window background color  
 lcdId : PCT\_LCD\_BACK -> Set back LCD icon window background color

[Abnormal processing]

- If PICT server communication information cannot be acquired because the PICT server is not started before this API function is executed, an error is returned.
- If the PICT server does not have display ID equivalent to the specified lcdId, an error is returned. The icon window background color remains unchanged.
- If the icon window equivalent to the specified winId has the transparent background,

an error is returned. The icon window background color remains unchanged.

- If the PICT server does not have the icon window equivalent to the specified winId, an error is returned. The icon window background color remains unchanged.
- If the member (except pixel) of the specified background color structure “color” is out of range from 0x0000 to 0xFFFF, an error is returned. The icon window background color remains unchanged.

## 2.12 Back PICT display processing

**pct\_BackLcdActionCtrl****Overview**

Executes back PICT display processing according to the back LCD display status.

**Format**

```
short pct_BackLcdActionCtrl (
 MsbObject *from ,
 int blsts
);
```

**Arguments**

**from** [I]: Initialized MSB object

**blsts** [I]: Back display status

PCT\_DSP\_ON (display back PICT)

PCT\_DSP\_OFF (hide back PICT)

**Return values**

**PCT\_OK** : Normal

**PCT\_ERR** : Error

**Description**

[Normal processing]

- If PCT\_DSP\_ON is specified, the back PICT is displayed. If PCT\_DSP\_OFF is specified, the back PICT is not displayed.

[Abnormal processing]

- If the value in blsts is other than PCT\_DSP\_ON or PCT\_DSP\_OFF, an error is returned.

**Note**

- Only window manager can use this function.



### 3. Image library

#### 3.1 Image data check request

|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |        |                    |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------------------|
| Classification   | Image library support function                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |        |                    |
| Function         | Image data check                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Symbol | Elib_IMG_AttachChk |
| Overview         | <p>- This function checks specified image data (JPEG) to determine whether the data is normal and obtains copyright information (on whether a copyright is held).</p> <p>- Image data can only be transferred when ELIB_IMG_CP_OFF (no copyright) is set in cp_flg (copyright information) and ELIB_IMG_FORMAT_CHK_OK (format normal) is set in ForMat_Result (result of format check for data attachment).<br/>A copyright can only be held when copy="NO" is described in the comment field of the image data.</p> <p>Parameter: Structure for checking attached image data</p> <pre>typedef struct tagELIB_IMG_ATCH_CHK {     unsigned char    type; /* [I/-] Image data type */                         /*      ELIB_IMG_TYPE_JPEG :   JPEG data */     unsigned char *  data; /* [I/O] Image data pointer */ *1     unsigned long    size; /* [I/-] Image data size*/     unsigned char    reserve; /* [-/-] Reserved (not used) */     unsigned char    cp_flg; /* [-/O] File restriction      */                         /*      ELIB_IMG_CP_ON:   Restricted */                         /*      ELIB_IMG_CP_OFF:  Not restricted */                         /*      This information is valid only when ELIB_IMG_OK (normal end) is returned from this function.*/     unsigned char    sv_flg ;    /* [-/O] External storage permission flag */                         /*      Flag value ELIB_IMG_SV_0 No identifier */                         /*      ELIB_IMG_SV_1 Copyright free */                         /*      ELIB_IMG_SV_2 Only data encryption */                         /*      ELIB_IMG_SV_3 User bind */                         /*      ELIB_IMG_SV_4 Set bind */                         /*      ELIB_IMG_SV_5 External storage not permitted */     unsigned char    ForMat_Result; /* [-/O] Result of format check for data attachment*/                         /*      ELIB_IMG_FORMAT_CHK_OK: Format normal */                         /*      ELIB_IMG_FORMAT_CHK_NG: Format abnormal */                         /*      ELIB_IMG_FORM_OTHER: Format other than GIF89a */ }_ELIB_IMG_ATCH_CHK;</pre> |        |                    |
| Include file     | srv_img.h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |        |                    |
| Calling sequence | int Elib_IMG_AttachChk( unsigned int Ap_ID, _ELIB_IMG_ATCH_CHK *ChkData);                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |        |                    |

| Argument            | Type                                                                                                                       | I/O | Description                                                                                                                                                                                                |
|---------------------|----------------------------------------------------------------------------------------------------------------------------|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ap_ID               | unsigned int                                                                                                               | I   | Application ID                                                                                                                                                                                             |
| ChkData             | _ELIB_IMG_ATCH_CHK*                                                                                                        | I/O | Pointer to structure for checking attached image data                                                                                                                                                      |
| Return value        | Type                                                                                                                       | I/O | Description                                                                                                                                                                                                |
| ret                 | int                                                                                                                        | O   | Normal end    ELIB_IMG_OK<br>Execution    ELIB_IMG_NG<br>result<br>unacceptable<br>Data   other   ELIB_IMG_PARAM_NG<br>than JPEG<br>Image<br>pointer null<br>Image   size<br>exceeding<br>allowed<br>range |
| Necessary procedure |                                                                                                                            |     |                                                                                                                                                                                                            |
| Note/Prohibition    | *1:<br>Set a size that is two bytes larger than the image data size (size) when allocating an area (data) for JPEG images. |     |                                                                                                                                                                                                            |
| Remarks             |                                                                                                                            |     |                                                                                                                                                                                                            |

## 3.2 Image data type acquisition request

| Classification   | Image library support function                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |        |                                                           |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------------------------------------------------------|
| Function         | Image data type acquisition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Symbol | Elib_IMG_GetType                                          |
| Overview         | <p>- This function obtains the type (JPEG) of specified image data.</p> <p>- Specified image data information is set upon normal completion of analysis (with normal set as the check result). (An undefined value is set if abnormal is set as the check result.)</p> <p>1. When SOI is found, ELIB_IMG_BASELINE, ELIB_IMG_PROGRESSIVE, or ELIB_IMG_EXBASELINE is stored in wFormat.</p> <p>/* Details of structure for acquiring image data type */</p> <pre>typedef struct tagELIB_IMG_TYPEINFO {     unsigned short    wType;    /* [-/-] Image data type (not used) */     unsigned char *   bpImgData ; /* [I/O] Image data storage area pointer */ *1     unsigned long     dwImgDataLen ; /* [I/-] Image data size */     unsigned short    DataChk ; /* [-/O] Check result */                         /*      ELIB_IMG_DATA_OK: Normal */                         /*      ELIB_IMG_DATA_UNKNOWN: Other than JPEG */                         /*      ELIB_IMG_DATA_NG: Abnormal */     unsigned short    wFormat ; /* [-/O] Details of image data type */                         /*      For JPEG image */                         /*      ELIB_IMG_BASELINE: Baseline */                         /*      ELIB_IMG_PROGRESSIVE: Progressive */                         /*      ELIB_IMG_EXBASELINE: Extended baseline */      unsigned short    CopyRight ; /* [-/O] File restriction *Not used when SWF data is set as data type (wFormat) */                         /*      ELIB_IMG_COPY_OK: Not restricted */                         /*      ELIB_IMG_COPY_NO: Restricted */ } _ELIB_IMG_TYPEINFO ;</pre> |        |                                                           |
| Include file     | srv_img.h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                                                           |
| Calling sequence | int Elib_IMG_GetType (unsigned int Ap_ID, _ELIB_IMG_TYPEINFO * typeinfo);                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                                                           |
| Argument         | Type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | I/O    | Description                                               |
| Ap_ID            | unsigned int                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | I      | Application ID                                            |
| typeinfo         | _ELIB_IMG_TYPEINFO *                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | I/O    | Pointer to structure for acquiring image data information |
| Return value     | Type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | -      | Description                                               |
| ret              | int                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | O      | Normal end<br>ELIB_IMG_OK                                 |

|                        |                                                                                                                                                 |                                       |                                      |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|--------------------------------------|
|                        |                                                                                                                                                 | Abnormal<br>end<br>Parameter<br>error | ELIB_IMG_NG<br><br>ELIB_IMG_PARAM_NG |
| Necessary<br>procedure |                                                                                                                                                 |                                       |                                      |
| Note/Prohibition       | <p>*1:<br/>Set a size that is two bytes larger than the image data size (dwImgDataLen) when allocating an area (bpImgData) for JPEG images.</p> |                                       |                                      |
| Remarks                |                                                                                                                                                 |                                       |                                      |

## 3.3 JPEG data format mode acquisition

|                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |        |                                                                                                                                                                                                |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Classification      | Image library support function                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |        |                                                                                                                                                                                                |
| Function            | JPEG data format mode acquisition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Symbol | Elib_IMG_Get_JPEG_Mode                                                                                                                                                                         |
| Overview            | <p>This function obtains the format mode of JPEG data.</p> <p>- This function obtains the format mode of a specified JPEG file.</p> <p>Parameter: Structure for checking attached image data</p> <pre>typedef struct tagELIB_IMG_JPEG_MODE {     unsigned char    type ; /* [I/-] Image data type */                         /*      ELIB_IMG_TYPE_JPEG:  JPEG data */     unsigned char *  data ; /* [I/O] Image data pointer */ *1     unsigned long    size ; /* [I/-] Image data size*/     unsigned char    FormatMode ; /* [-/O] Format mode */                         /*      ELIB_IMG_BASELINE:  Baseline JPEG */                         /*      ELIB_IMG_PROGRESSIVE: Progressive JPEG */                         /*      ELIB_IMG_EXBASELINE: Extended baseline JPEG */                         /*      This information is valid only when ELIB_IMG_OK (normal end) is returned from this function.*/ } _ELIB_IMG_JPEG_MODE ;</pre> |        |                                                                                                                                                                                                |
| Include file        | srv_img.h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |        |                                                                                                                                                                                                |
| Calling sequence    | int Elib_IMG_Get_JPEG_Mode(unsigned int Ap_ID, _ELIB_IMG_JPEG_MODE* Jpeg_data);                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |        |                                                                                                                                                                                                |
| Argument            | Type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | I/O    | Description                                                                                                                                                                                    |
| Ap_ID               | unsigned int                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | I      | Application ID                                                                                                                                                                                 |
| Jpeg_data           | _ELIB_IMG_JPEG_MODE *                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | I/O    | Pointer to structure for acquiring JPEG image format mode                                                                                                                                      |
| Return value        | Type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | I/O    | Description                                                                                                                                                                                    |
| ret                 | int                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | O      | Normal end ELIB_IMG_OK<br>Execution ELIB_IMG_NG<br>result<br>unacceptable<br>Data other ELIB_IMG_PARAM_NG<br>than JPEG<br>Image<br>pointer null<br>Image size<br>exceeding<br>allowed<br>range |
| Necessary procedure |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |        |                                                                                                                                                                                                |

|                  |                                                                                                                            |
|------------------|----------------------------------------------------------------------------------------------------------------------------|
| Note/Prohibition | *1:<br>Set a size that is two bytes larger than the image data size (size) when allocating an area (data) for JPEG images. |
| Remarks          |                                                                                                                            |

## 3.4 Image data size check

|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |        |                      |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|----------------------|
| Classification   | Image library support function                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |        |                      |
| Function         | Image data size check                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Symbol | Elib_IMG_DataSizeChk |
| Overview         | <p>- This function checks the size of JPEG image data to determine whether the data can be stored on a mobile telephone.</p> <p>- This function checks the size of JPEG image data to determine whether the data can be stored on a mobile telephone; it sets ELIB_IMG_DATA_OK in ELIB_IMG_DATA_INFO member DataChk when data can be stored, or ELIB_IMG_DATA_NG when data cannot be stored.</p> <p>- If the size checked exceeds 1616 horizontally or 1212 vertically, this function sets ELIB_IMG_DATA_NG.</p> <p>(a) If a s Image data type (not used) */et parameter is incorrect, this function returns ELIB_IMG_PARAM_NG.</p> <p>(b) For an unsupported format, this function returns ELIB_IMG_FORMAT_ERR.</p> <p>(c) For an abnormal image, this function returns ELIB_IMG_NG.</p> <p>(d) At normal termination, this function returns ELIB_IMG_OK and sets obtained result in ELIB_IMG_DATA_INFO member DataChk.</p> <pre> /* Structure for checking JPEG image data size */ typedef struct tagELIB_IMG_DATA_INFO {     unsigned char    ImgType; /* [I/-] Image type (JPEG) */                         /*      ELIB_IMG_TYPE_JPEG: JPEG          */     unsigned char *  ImgDataptr; /* [I/O] Image data pointer */ *1     unsigned long    ImgDataLen; /* [I/-] Image data size */ *2     unsigned char    FormatMode; /* [-/-] Format mode (not used) */     unsigned char    Copyright; /* [-/-] Copyright information flag (not used) */     unsigned char    DataChk; /* [-/O] Data check flag (indicating whether image data can be stored) */                         /*      ELIB_IMG_DATA_OK:  Can be stored on mobile telephone */                         /*      ELIB_IMG_DATA_NG:  Can be stored on mobile telephone */ } _ELIB_IMG_DATA_INFO ; </pre> |        |                      |
| Include file     | srv_img.h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |        |                      |
| Calling sequence | int Elib_IMG_DataSizeChk(unsigned int Ap_ID, _ELIB_IMG_DATA_INFO * datainfo);                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                      |
| Argument         | Type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | I/O    | Description          |
| Ap_ID            | unsigned int                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | I      | Application ID       |

|                        |                                                                                                                                                                                                                                                                                                                                              |     |                                                                                                                                         |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----------------------------------------------------------------------------------------------------------------------------------------|
| Datainfo               | _ELIB_IMG_DATA_INFO<br>*                                                                                                                                                                                                                                                                                                                     | I/O | Pointer to structure for checking JPEG<br>image data size                                                                               |
| Return value           | Type                                                                                                                                                                                                                                                                                                                                         | -   | Description                                                                                                                             |
| ret                    | int                                                                                                                                                                                                                                                                                                                                          | O   | Normal end<br>Abnormal end<br>Parameter error<br>Format error<br>ELIB_IMG_OK<br>ELIB_IMG_NG<br>ELIB_IMG_PARAM_NG<br>ELIB_IMG_FORMAT_ERR |
| Necessary<br>procedure |                                                                                                                                                                                                                                                                                                                                              |     |                                                                                                                                         |
| Note/Prohibition       | <p>*1 Image data pointer<br/>Pass a field with a size two bytes larger than the image data size as an image data buffer so that termination point data (EOI marker) can be attached to target JPEG data without termination point data.</p> <p>*2 Image data size<br/>Set the original data size in ImgDataLen without adding two bytes.</p> |     |                                                                                                                                         |
| Remarks                |                                                                                                                                                                                                                                                                                                                                              |     |                                                                                                                                         |



## 3.5 JPEG data information acquisition

|                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |        |                                                                                                                                                                                 |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Classification      | Image library support function                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |        |                                                                                                                                                                                 |
| Function            | JPEG data information acquisition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Symbol | Elib_IMG_JpegInfoGet                                                                                                                                                            |
| Overview            | <ul style="list-style-type: none"> <li>- This function analyzes specified image data to return image information (width, height).</li> <li>- This function can also be used while target data is being processed by the image data decode open function (A-7).</li> <li>- If an abnormality is detected in the specified data (e.g., unsupported sample ratio, data other than JPEG), this function terminates abnormally by returning ELIB_IMG_JPG_DECERR to indicate that the specified data cannot be decoded.</li> </ul> <pre> /* Structure for obtaining and storing image data information */ typedef struct tagELIB_IMG_DATAINFO {     unsigned char *    pucImgData ;    /* [I/O] Image data pointer (to image data to be analyzed) */     unsigned long      usImgDataLength ; /* [I/-] Image data size */     unsigned short     usWidth ;        /* [-/O] Image width */     unsigned short     usHeight ;      /* [-/O] Image height */ } _ELIB_IMG_DATAINFO ; </pre> |        |                                                                                                                                                                                 |
| Include file        | srv_img.h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |        |                                                                                                                                                                                 |
| Calling sequence    | int Elib_IMG_JpegInfoGet(unsigned int Ap_ID, _ELIB_IMG_DATAINFO * DataInfo) ;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |        |                                                                                                                                                                                 |
| Argument            | Type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | I/O    | Description                                                                                                                                                                     |
| Ap_ID               | unsigned int                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | I      | Application ID                                                                                                                                                                  |
| DataInfo            | _ELIB_IMG_DATAINFO *                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | I/O    | Pointer to structure for obtaining and storing image data information                                                                                                           |
| Return value        | Type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | -      | Description                                                                                                                                                                     |
| ret                 | int                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | O      | Normal end ELIB_IMG_OK<br>Abnormal end ELIB_IMG_NG<br>(Unexpected error from low-order layer)<br>Decoding not possible ELIB_IMG_JPG_DECERR<br>Parameter error ELIB_IMG_PARAM_NG |
| Necessary procedure |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |        |                                                                                                                                                                                 |
| Note/Prohibition    | <b>1. An application should check the stack area size when calling this function because this function uses a stack area of about 400 bytes in size for internal work.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |        |                                                                                                                                                                                 |

|         |                                                                                                                                                                             |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         | 2. Set a size that is two bytes larger than the image data size (uslmgDataLength) in pucImgData so that an EOI marker can be attached to target data without an EOI marker. |
| Remarks |                                                                                                                                                                             |

## 3.6 Thumbnail data acquisition

|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |        |                                                                                                                             |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------------------------------------------------------------------------------------------------------------------------|
| Classification   | Image library support function                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |        |                                                                                                                             |
| Function         | Thumbnail data acquisition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Symbol | Elib_IMG_JpegThumbnailDataGet                                                                                               |
| Overview         | <p>(1) If an incorrect parameter is set, this function returns ELIB_IMG_PARAM_NG.</p> <p>(2) If other than JPEG data is specified, this function returns ELIB_IMG_FORMAT_ERR.</p> <p>(3) For other errors, this function returns ELIB_IMG_NG.</p> <p>(4) At normal termination, this function returns ELIB_IMG_OK.</p> <p>Structure for acquiring thumbnail data</p> <pre>typedef struct tagELIB_IMG_THUMB_DATA_GET {     unsigned char    *pucImgData;        Pointer to top of JPEG data (IN)     unsigned long    dwDataSize;          JPEG data size (IN)     unsigned long    dwThumbDataOffset;   Offset for thumbnail data (OUT) *1     unsigned long    dwThumbSize;         Thumbnail data size (OUT) *2 } _ELIB_IMG_THUMB_DATA_GET;</pre> <p>*1: The offset value of the top of thumbnail data for pucImgData (top of JPEG data) is set.</p> <p>*2: If there is no thumbnail data in JPEG data, zero is set in dwThumbSize.</p> <p>After calling this function, the high-order layer fetches thumbnail data through the following processing:</p> <p>(1) Allocation of buffer with size set in dwThumbSize (thumbnail data size)</p> <p>(2) Calculation of thumbnail data start position by adding value set in dwThumbDataOffset (offset for thumbnail data ) to value in pucImgData (pointer to top of JPEG data)</p> <p>(3) Copying of data, beginning from thumbnail data start position calculated in Step (2), that has same length as that set in dwThumbSize (thumbnail data size) in buffer allocated in Step (1)</p> |        |                                                                                                                             |
| Include file     | srv_img.h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                                                                                                                             |
| Calling sequence | int Elib_IMG_JpegThumbnailDataGet (unsigned int Ap_ID, _ELIB_IMG_THUMB_DATA_GET *pImgData);                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |        |                                                                                                                             |
| Argument         | Type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | I/O    | Description                                                                                                                 |
| Ap_ID            | unsigned int                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | I      | Application ID                                                                                                              |
| pImgData         | _ELIB_IMG_THUMB_DATA_GET*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | I/O    | Pointer to structure for acquiring thumbnail data                                                                           |
| Return value     | Type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | -      | Description                                                                                                                 |
| ret              | int                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | O      | Normal end ELIB_IMG_OK<br>Abnormal end ELIB_IMG_NG<br>Parameter error ELIB_IMG_PARAM_NG<br>Format error ELIB_IMG_FORMAT_ERR |

|                        |  |
|------------------------|--|
| Necessary<br>procedure |  |
| Note/Prohibition       |  |
| Remarks                |  |

## 3.7 Image data decode open

|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |                                                          |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|----------------------------------------------------------|
| Classification   | Image library support function                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |                                                          |
| Function         | Image data decode open                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Symbol | Elib_IMG_DecodeOpen                                      |
| Overview         | <p>- This function returns image display information contained in image data (specified as the display target), an area size required for decoding image data (HeapSize), and handle number (Handle).</p> <p>- Call the image data decode close function after terminating required decode processing with this function.</p> <p>[Decode open and close with multiwindow capability]</p> <p>- This function can be called regardless of whether it is active or not.</p> <p>- Image data can be opened simultaneously by two or more (up to 32) applications.</p> <p>* Up to 32 tables that can be managed in Image Library.</p> <p>A work area required for decode open should be allocated (released in closing) with Image Library. If an allocation error occurs, ELIB_IMG_HEAP is returned.</p> <p>/* Details of structure for image data decode open */</p> <pre>typedef struct tagELIB_IMG_INFO_OPEN {     unsigned char    heap_area_mode; /* [I/-] Specify a memory allocation destination. */                         /*      ELIB_MM_AREA_AP    Allocated with AP */ See *1.     unsigned char *  pucImgData    ; /* [I/O] Target image data pointer */ See *4.     unsigned long    usImgDataLength ;/* [I/-] Target image data size          */     unsigned short   usWidth       ;/* [-/O] Image display width */     unsigned short   usHeight      ;/* [-/O] Image display height */     unsigned short   usFrameCount  ;/* [-/O] Number of frames (not defined for JPEG) */     unsigned short   usLoopCount   ;/* [-/O] Animation loop count (not defined for JPEG) */ } _ELIB_IMG_INFO_OPEN ;</pre> <p>*1 Always set ELIB_MM_AREA_AP in heap_area_mode. For a value other than ELIB_MM_AREA_AP, ELIB_IMG_PARAM_NG is returned.</p> <p>*4 Set a size that is two bytes larger than the target data size (usImgDataLength) when allocating an area (pucImgData) for image type JPEG.</p> |        |                                                          |
| Include file     | srv_img.h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |        |                                                          |
| Calling sequence | <pre>int Elib_IMG_DecodeOpen (unsigned int Ap_ID, int ImgType,                         _ELIB_IMG_INFO_OPEN * ImgInfoOpen, unsigned                         char * Handle);</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |        |                                                          |
| Argument         | Type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | I/O    | Description                                              |
| Ap_ID            | unsigned int                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | I      | Application ID                                           |
| ImgType          | Int                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | I      | Specifies type of image.<br>JPEG data ELIB_IMG_TYPE_JPEG |

| ImgInfoOpen         | _ELIB_IMG_INFO_OPEN * | I/O | Specifies pointer to storage area of image data decode open structure.<br>For structure members, see details of structure above.                                                                                                                                                                                                                                                  |
|---------------------|-----------------------|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Handle              | unsigned char *       | O   | Specifies pointer to a handle number storage field.<br>This argument is valid when this function returns ELIB_IMG_OK (normal end).<br>At normal termination, this function returns a value other than 0 as the handle number.<br>There is only one handle number (only one image memory exists.)                                                                                  |
| Return value        | Type                  | I/O | Description                                                                                                                                                                                                                                                                                                                                                                       |
| ret                 | Int                   | O   | Normal end ELIB_IMG_OK<br>Abnormal end ELIB_IMG_NG<br>Parameter error ELIB_IMG_PARAM_NG<br>Format error ELIB_IMG_FORMAT_ERR<br>other than JPEG<br>Heap area ELIB_IMG_HEAP<br>allocation error<br>Maximum handle ELIB_IMG_HNDOVER<br>number exceeded<br>Width not possible ELIB_IMG_WIDTH_ERR<br>for decoding<br>Decoding not possible ELIB_IMG_JPG_DECERR<br>(only for JPEG file) |
| Necessary procedure |                       |     |                                                                                                                                                                                                                                                                                                                                                                                   |
| Note/Prohibition    |                       |     |                                                                                                                                                                                                                                                                                                                                                                                   |
| Remarks             |                       |     |                                                                                                                                                                                                                                                                                                                                                                                   |

## 3.8 Image data decode close

|                     |                                                                                                                                                                                        |        |                                                                                                                                               |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| Classification      | Image library support function                                                                                                                                                         |        |                                                                                                                                               |
| Function            | Image data decode close                                                                                                                                                                | Symbol | Elib_IMG_DecodeClose                                                                                                                          |
| Overview            | <ul style="list-style-type: none"> <li>- This function terminates image data decoding executed by the image data decode open function.</li> <li>-</li> </ul>                           |        |                                                                                                                                               |
| Include file        | Srv_img.h                                                                                                                                                                              |        |                                                                                                                                               |
| Calling sequence    | Int Elib_IMG_DecodeClose (unsigned int Ap_ID , unsigned char Handle );                                                                                                                 |        |                                                                                                                                               |
| Argument            | Type                                                                                                                                                                                   | I/O    | Description                                                                                                                                   |
| Ap_ID               | Unsigned int                                                                                                                                                                           | I      | Application ID                                                                                                                                |
| Handle              | Unsigned char                                                                                                                                                                          | I      | Image data decode handle number                                                                                                               |
| Return value        | Type                                                                                                                                                                                   | I/O    | Description                                                                                                                                   |
| Ret                 | Int                                                                                                                                                                                    | O      | Normal end      ELIB_IMG_OK<br>Abnormal end    ELIB_IMG_NG<br>Parameter error ELIB_IMG_PARAM_NG<br>Incorrect handle ELIB_IMG_HNDERR<br>number |
| Necessary procedure | <ul style="list-style-type: none"> <li>- Call this function after using the image data decode open function to obtain a handle number.</li> </ul>                                      |        |                                                                                                                                               |
| Note/Prohibition    | <ul style="list-style-type: none"> <li>- Always call this function (to release an allocated decode area) after terminating decoding by the image data decode open function.</li> </ul> |        |                                                                                                                                               |
| Remarks             |                                                                                                                                                                                        |        |                                                                                                                                               |

### 3.9 Image data decode

|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |        |                     |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------------------|
| Classification | Image library support function                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |        |                     |
| Function       | Image data decode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Symbol | Elib_IMG_DecodeData |
| Overview       | <ul style="list-style-type: none"> <li>- This function decodes image data to be displayed.</li> <li>- This function also executes reduction, dazaling (decoloring), and overlapping, and outputs 65,536-color (16-bit) bit- map format data as a result of decoding.</li> <li>- Allocate an area for decoding before calling this function.</li> <li>- This function decodes data in a clipping range specified with structure.</li> </ul> <pre> /*Details of structure (ImgDecode) for decoding images */ typedef struct tagELIB_IMG_DECODE {     unsigned char    usMode          ; /* [I-/] Decoding mode */  *3   Not used for JPEG                                 Specify frames to be decoded.                                 First frame: ELIB_IMG_DECODEFIRST  *4                                 Next frame: ELIB_IMG_DECODENEXT     unsigned char *  pucBmpData      ; /* [-/O] Pointer to target data: Decode area*2 */     unsigned char *  pucBgBmp       ; /* [I-/] Pointer to background bit-map data                                 (one-frame preceding frame) *2, *4 */*3   Not used for                                 JPEG     unsigned short   usClippingX     ; /* [I-/] X coordinate of clipping starting position in image*1 */     unsigned short   usClippingY     ; /* [I-/] Y coordinate of clipping starting position in image *1 */     unsigned short   usClippingWidth ; /* [I-/] Clipping width in image*1 */     unsigned short   usClippingHeight ; /* [I-/] Clipping height in image*1 */     unsigned short   usDrawWidth     ; /* [I-/] Drawing width (should not exceed usClippingWidth value)*1*/     unsigned short   usDrawHeight    ; /* [I-/] Drawing height (should not exceed usClippingHeight value)*1*/ } _ELIB_IMG_DECODE;  /* Details of frame information structure (ImgFrame) */ typedef struct tagELIB_IMG_FRAME_INFO {     unsigned short   usOffsetX;      /* Frame drawing X offset */ *5     unsigned short   usOffsetY;      /* Frame drawing Y offset */ *5     unsigned short   usWidth;        /* Frame drawing width */ *5     unsigned short   usHeight;       /* Frame drawing height */ *5 </pre> |        |                     |



| <pre> unsigned short  usDelayTime;    /* Frame display time (unit: 10 ms) */ unsigned short  usFrameNo;     /* Frame number */ unsigned char   ucDisposalMethod; /* Frame drawing method */ *6 unsigned char   ucTransFlag;   /* Transparency flag */                                 /* 0: Not transparent */                                 /* 1: Transparent */ } _ELIB_IMG_FRAME_INFO; </pre> |                                                                                                                                                                                                                                        |     |                                                                                                                                                                                                                                                                                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Include file                                                                                                                                                                                                                                                                                                                                                                                       | srv_img.h                                                                                                                                                                                                                              |     |                                                                                                                                                                                                                                                                                                                                                    |
| Calling sequence                                                                                                                                                                                                                                                                                                                                                                                   | <pre> int Elib_IMG_DecodeData(unsigned int Ap_ID, unsigned char Handle, int                         ImgType,                         _ELIB_IMG_DECODE * ImgDecode, _ELIB_IMG_FRAME_INFO                         *ImgFrameInfo); </pre> |     |                                                                                                                                                                                                                                                                                                                                                    |
| Argument                                                                                                                                                                                                                                                                                                                                                                                           | Type                                                                                                                                                                                                                                   | I/O | Description                                                                                                                                                                                                                                                                                                                                        |
| Ap_ID                                                                                                                                                                                                                                                                                                                                                                                              | unsigned int                                                                                                                                                                                                                           | I   | Application ID                                                                                                                                                                                                                                                                                                                                     |
| Handle                                                                                                                                                                                                                                                                                                                                                                                             | unsigned char                                                                                                                                                                                                                          | I   | Image data decode handle number                                                                                                                                                                                                                                                                                                                    |
| ImgType                                                                                                                                                                                                                                                                                                                                                                                            | Int                                                                                                                                                                                                                                    | I   | Specifies type of image display.<br>JPEG data: ELIB_IMG_TYPE_JPEG                                                                                                                                                                                                                                                                                  |
| ImgDecode                                                                                                                                                                                                                                                                                                                                                                                          | _ELIB_IMG_DECODE *                                                                                                                                                                                                                     | I/O | Specifies pointer to storage area of structure for decoding image data.<br>For structure members, see details of structure above.                                                                                                                                                                                                                  |
| ImgFrameInfo                                                                                                                                                                                                                                                                                                                                                                                       | _ELIB_IMG_FRAME_INFO *                                                                                                                                                                                                                 | O   | Specifies pointer to frame information structure.<br>Not used when ELIB_IMG_TYPE_JPEG is set in ImgType<br>See details of structure above.                                                                                                                                                                                                         |
| Return value                                                                                                                                                                                                                                                                                                                                                                                       | Type                                                                                                                                                                                                                                   | I/O | Description                                                                                                                                                                                                                                                                                                                                        |
| ret                                                                                                                                                                                                                                                                                                                                                                                                | Int                                                                                                                                                                                                                                    | O   | Normal end    ELIB_IMG_OK<br>Abnormal end    ELIB_IMG_NG<br>Parameter error    ELIB_IMG_PARAM_NG<br>Incorrect handle number    ELIB_IMG_HNDERR<br>Maximum height exceeded    ELIB_IMG_HEIGHT_ERR<br>Maximum width exceeded    ELIB_IMG_WIDTH_ERR<br>Heap error    ELIB_IMG_HEAP<br>* ELIB_IMG_HEAP is returned only when ELIB_IMG_TYPE_JPEG is set |

|                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |             |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-------------|
|                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  | in imgType. |
| Necessary procedure | <ul style="list-style-type: none"> <li>- Call this function after using the image data decode open function to obtain a handle number.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |             |
| Note/Prohibition    | <p>*Notes on usage</p> <p>*1 Value in decoding the first frame is valid.</p> <ul style="list-style-type: none"> <li>- The coordinate values must not exceed the original image size.<br/> <math>usClippingX + usClippingWidth \leq usWidth</math><br/> <math>usClippingY + usClippingHeight \leq usHeight</math></li> <li>- If the specified drawing size (usDrawWidth, usDrawHeight) is smaller than the specified clipping size, the clipped image size is reduced to the drawing size.</li> <li>- If 0 is specified as the drawing width (usDrawWidth) or height (usDrawHeight), the specified clipping size is used as the size of the output bit map.</li> </ul> <p>*2 Specify a heap area.<br/> Set a size that is two bytes larger than the image size for the heap area to be allocated.</p> <p>*3 For JPEG data, the _ELIB_IMG_FRAME_INFO structure and following _ELIB_IMG_DECODE structure members are Not used:<br/> (1) usMode<br/> (2) pucBgBmp</p> <p>*4 Set null in pucBgBmp for the first frame without overlapping the background bit map.</p> <p>*5 These values indicate frame position and range in the output bit map. Specify these values in a drawing request.</p> <p>*6 Set data output for the preceding frame (especially when using different areas).<br/> Example) First frame: No data is to be set.<br/> Second frame: Set output data (ucDisposalMethod ) for the first frame.<br/> Nth frame: Set output data (ucDisposalMethod ) for the (N-1)th frame.</p> |  |             |
| Remarks             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |             |

## 3.10 Image data total decode

|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |        |                        |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------------|
| Classification | Image library support function                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |        |                        |
| Function       | Image data total decode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Symbol | Elib_IMG_DecodeDataAll |
| Overview       | <ul style="list-style-type: none"> <li>- Set a clipping position and drawing width in structure <code>ImgDrawInfo</code> for the total image.</li> <li>- This function outputs 65,536-color (16-bit) bit-map format data for each frame as a decoding result.</li> <li>- The high-order layer should allocate areas for decoding (as many frame information structure areas as the number of frames to be processed and bit map areas specified in frame information structure member <code>pucBmpData</code> for all frames to be processed) before calling this function. A size obtained by multiplying the <code>usDrawWidth</code> value, <code>DrawHeight</code> value, and 2 together is required for each bit map area.</li> <li>- This function decodes data in a clipping range specified in structure.</li> </ul> <pre> /* Details of drawing information structure (ImgDrawInfo) */ typedef struct tagELIB_IMG_DRAW_INFO {     unsigned short    usWidth ;           /* [I/-] Image width */     unsigned short    usHeight ;          /* [I/-] Image height */     unsigned short    usFrameCount ;      /* [I/-] Number of frames */     unsigned short    usLoopCount ;       /* [-/-] Loop count */(not used)     unsigned short    usClippingX;        /* [I/-] X coordinate of clipping start position in image*/     unsigned short    usClippingY;        /* [I/-] Y coordinate of clipping start position in image */     unsigned short    usClippingWidth;    /* [I/-] Clipping width in image */     unsigned short    usClippingHeight;   /* [I/-] Clipping height in image*/     unsigned short    usDrawWidth;        /* [I/-] Drawing width (should not exceed usClippingWidth value) */     unsigned short    usDrawHeight;       /* [I/-] Drawing height (should not exceed usClippingHeight value) */ } _ELIB_IMG_DRAW_INFO;  /* Details of frame information structure (ImgFrame) */ typedef struct tagELIB_IMG_FRAME {     _ELIB_IMG_FRAME_INFO stFrameInfo; /* Frame information */     unsigned char *       pucBmpData ; /* Bit map area (Set the address before calling this function.)*See *1. } _ELIB_IMG_FRAME; *1 The application should allocate and release areas specified in pucBmpData. </pre> |        |                        |

```
typedef struct tagELIB_IMG_FRAME_INFO
{
 unsigned short usOffsetX; /* [-/O] Frame drawing X offset */
 unsigned short usOffsetY; /* [-/O] Frame drawing Y offset */
 unsigned short usWidth; /* [-/O] Frame drawing width */
 unsigned short usHeight; /* [-/O] Frame drawing height */
 unsigned short usDelayTime; /* [-/O] Frame display time (unit: 10 ms) */
 unsigned short usFrameNo; /* [-/O] Frame number */
 unsigned char ucDisposalMethod; /* [-/O] Frame drawing method */
 unsigned char ucTransFlag; /* [-/O] Transparency flag */
 /* 0: Not transparent */
 /* 1: Transparent */
} _ELIB_IMG_FRAME_INFO;
```

\*1 Set the values obtained with the image data decode open function (A-7).

| Include file        | srv_img.h                                                                                                                            |     |                                                                                                                                                                                        |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Calling sequence    | int Elib_IMG_DecodeDataAll(unsigned int Ap_ID, unsigned char Handle, _ELIB_IMG_DRAW_INFO * ImgDrawInfo, _ELIB_IMG_FRAME * ImgFrame); |     |                                                                                                                                                                                        |
| Argument            | Type                                                                                                                                 | I/O | Description                                                                                                                                                                            |
| Ap_ID               | unsigned int                                                                                                                         | I   | Application ID                                                                                                                                                                         |
| Handle              | unsigned char                                                                                                                        | I   | Specifies the image data decode handle number.<br>Value obtained by image data decode open request                                                                                     |
| ImgDrawInfo         | _ELIB_IMG_DRAW_INFO *                                                                                                                | I   | Specifies pointer to drawing information structure.                                                                                                                                    |
| ImgFrame            | _ELIB_IMG_FRAME *                                                                                                                    | O   | Specifies pointer to frame information structure.<br>(Addresses of decode areas for all frames)                                                                                        |
| Return value        | Type                                                                                                                                 | I/O | Description                                                                                                                                                                            |
| ret                 | int                                                                                                                                  | O   | Normal end<br>Not less than 1 (number of frames to be decoded)<br>Abnormal end<br>ELIB_IMG_NG<br>Parameter error<br>ELIB_IMG_PARAM_NG<br>Incorrect handle<br>ELIB_IMG_HNDERR<br>number |
| Necessary procedure |                                                                                                                                      |     |                                                                                                                                                                                        |

| Note/Prohibition |  |
|------------------|--|
| Remarks          |  |
|                  |  |

## 3.11 Image data Encode

| Classification | Image library support function                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |        |                 |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------------|
| Function       | Image data encode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Symbol | Elib_IMG_Encode |
| Overview       | <p>- This function encodes image data to JPEG data.</p> <pre> /* Details of image data encode structure */ typedef struct tagELIB_IMG_ENCIMGDATAINFO {     unsigned short    wFormat ;    /* [I/-] Format */                                 /*      ELIB_IMG_TYPE_RGB565      */     unsigned short    wWidth;      /* [I/-] Width of unencoded data */ *1     unsigned short    wHeight ;    /* [I/-] Height of unencoded data */ *1     short             sStart_X ;    /* [I/-] Trimming start position - X */     short             sStart_Y ;    /* [I/-] Trimming start position - Y */     short             sEnd_X ;      /* [I/-] Trimming end position - X */     short             sEnd_Y ;      /* [I/-] Trimming end position - Y */     /* A trimming start position in the target image is valid. The minimum size is 1x1;        maximum size is the image size.*/     short             sOutWidth ;    /* [I/-] Output width (0 to 640) */     short             sOutHeight ;    /* [I/-] Output height (0 to 480) */     unsigned long      dwSize ;      /* [I/-] Data size (to be set for encoded data) */     union     {         unsigned char *    bpRgp ;    /* [I/-] RGB data */         unsigned char *    bpYuv[3] ; /* [I/-] YCbCr data (currently not used)*/         unsigned char *    bpStream ; /* [I/-] Encoded data (currently not used) */     } data ; } _ELIB_IMG_ENCIMGDATAINFO ;  *1 Only the following widths and heights can be input:     -VGA (640×480), CIF (352×288), wait (176×198), QCIF (176×144), SubQCIF (128×96)  typedef struct tagELIB_IMG_ENCEXIFINFO {     char             cDummy[4] ;    /* [I/-] Reserved for Exif information specified from application */                                 /*      Currently not used (Set 0.)*/ } _ELIB_IMG_ENCEXIFINFO ;  /* Details of image data encode structure */ typedef struct tagELIB_IMG_ENCODEPARAM {     char             cCompress ;    /* [I/-] Encoding ratio *Used for JPEG */                                 /*      ELIB_IMG_JPEG_SIZE: Priority is given to size. */ </pre> |        |                 |

```

/* ELIB_IMG_JPEG_QUALITY: Priority is given to
quality. */
 unsigned char bThmb ; /* [I/-] Whether thumbnail is present (used only
for JPEG) */

/* Sets ELIB_IMG_THUMB_OFF. */
 unsigned char bFormat ; /* [I/-] Output coding format [JFIF] */
/* ELIB_IMG_TYPE_JPEG_JFIF */
 _ELIB_IMG_ENCIMGDATAINFO tPrimary_In ; /* [I/-] Input main image data
information */
 _ELIB_IMG_ENCIMGDATAINFO tThumb_In ; /* [I/-] Input thumbnail data
information */

/* Currently not used; set null. */
 _ELIB_IMG_ENCEXIFINFO * tpExifBuf ; /* [I/-] Exif information (IN) *Used only for
JPEG */

/* Currently not used; set null pointer. */
 unsigned char bCopyRight ; /* [I/-] File restriction information */
/* ELIB_IMG_COPY_NO Restricted */
/* ELIB_IMG_COPY_OK Not restricted */
} _ELIB_IMG_ENCODEPARAM ;

/* Structure for storing encoded data */
typedef struct tagELIB_IMG_OUTDATA
{
 unsigned char * bpOutImgData ; /* [I/O] Pointer to storage area for output image
data */
 /* *The high-order layer should allocate a storage area by generally specifying the
maximum size (20K bytes). */
 /* Allocates a 100K-byte area for VGA image data.*/
 unsigned long dwOutImgLen ; /* [I/O] Size of storage area for output image
data */
/* IN: Set the size of the storage area for output image
data. */
/* OUT: Store the size of encoded and output image
data. */
} _ELIB_IMG_OUTDATA ;

/* Detailed structure of interface with high-order layer of JPEG encoder
*/
typedef struct _ELIB_IMG_JPEGENCINFO
{
 _ELIB_IMG_ENCODEPARAM * ImgEncode_Param ; /* Pointer to storage area for
image data encode structure */
 unsigned char * outinf ; /* Pointer to output information *Used in encoder */
/* *Set pointer to area allocated with size (30 bytes) set in
ELIB_IMG_OUTINF_SIZE.*/

```

| <pre>         unsigned char *      workbuf ;          /* Pointer to storage area for encode work information *Used in encoder */                                 /* *Set pointer to area allocated with size (650,000 bytes) set in ELIB_IMG_WORKBUF_SIZE.*/     } _ELIB_IMG_JPEGENCINFO ; </pre> |                                                                                                                                                                                                                                                                                                                                                                                      |     |                                                                                                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|--------------------------------------------------------------------------------------------------------|
| Include file                                                                                                                                                                                                                                                                                      | srv_img.h                                                                                                                                                                                                                                                                                                                                                                            |     |                                                                                                        |
| Calling sequence                                                                                                                                                                                                                                                                                  | <pre> int Elib_IMG_Encode (unsigned int Ap_ID, _ELIB_IMG_JPEGENCINFO *ImgEncode_info,                                 _ELIB_IMG_OUTDATA * OutData); </pre>                                                                                                                                                                                                                           |     |                                                                                                        |
| Argument                                                                                                                                                                                                                                                                                          | Type                                                                                                                                                                                                                                                                                                                                                                                 | I/O | Description                                                                                            |
| Ap_ID                                                                                                                                                                                                                                                                                             | unsigned int                                                                                                                                                                                                                                                                                                                                                                         | I   | Application ID                                                                                         |
| ImgEncode                                                                                                                                                                                                                                                                                         | _ELIB_IMG_JPEGENCINFO *                                                                                                                                                                                                                                                                                                                                                              | I   | Pointer to storage area for JPEG encoder structure                                                     |
| OutData                                                                                                                                                                                                                                                                                           | _ELIB_IMG_OUTDATA *                                                                                                                                                                                                                                                                                                                                                                  | I/O | Pointer to storage structure area for output image data                                                |
| Return value                                                                                                                                                                                                                                                                                      | Type                                                                                                                                                                                                                                                                                                                                                                                 | -   | Description                                                                                            |
| ret                                                                                                                                                                                                                                                                                               | Int                                                                                                                                                                                                                                                                                                                                                                                  | O   | Normal end      ELIB_IMG_OK<br>Abnormal end      ELIB_IMG_NG<br>Parameter error      ELIB_IMG_PARAM_NG |
| Necessary procedure                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                      |     |                                                                                                        |
| Note/Prohibition                                                                                                                                                                                                                                                                                  | <ol style="list-style-type: none"> <li>1. The high-order layer should allocate an area for output image data.</li> <li>2. The maximum size should be specified for the output image data area to be allocated.</li> <li>3. The high-order layer should allocate areas for output information data and encode work information data in the ELIB_IMG_JPEGENCINFO structure.</li> </ol> |     |                                                                                                        |
| Remarks                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                      |     |                                                                                                        |



## 3.12 Image data encode 2

|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |                  |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Classification | Image library support function                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |        |                  |
| Function       | Image data encode 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Symbol | Elib_IMG_Encode2 |
| Overview       | <ul style="list-style-type: none"> <li>- This function encodes image data (RGB565 16-bit data).</li> <li>- This function also expands and reduces image data.</li> <li>- This function cannot encode two or more data items simultaneously.</li> <li>- When redistribution is not permitted, this function returns image data by setting copy="NO" in the COM marker area.</li> <li>- When redistribution is permitted, this function returns image data by setting 000000000 in the COM marker area.</li> </ul> <pre> /* Details of image data encode structure */ typedef struct tagELIB_IMG_ENCIMGDATAINFO {     unsigned short  wFormat ;    /* [I/-] Format */                                 /*      ELIB_IMG_TYPE_RGB565   */     unsigned short  wWidth;      /* [I/-] Width (1 to 640) */     unsigned short  wHeight;     /* [I/-] Height (1 to 480) */     short           sStart_X ;    /* [I/-] Trimming start position - X */     short           sStart_Y ;    /* [I/-] Trimming start position - Y */     short           sEnd_X ;      /* [I/-] Trimming end position - X */     short           sEnd_Y ;      /* [I/-] Trimming end position - Y */     /* A trimming start position in the target image is valid. The minimum size is 1x1;        maximum size is the image size.*/     short           sOutWidth ;   /* [I/-] Output width (1 to 640) */     short           sOutHeight ;  /* [I/-] Output height (1 to 480) */     unsigned long    dwSize ;     /* [I/-] Data size (to be set for encoded data) */     union     {         unsigned char *   bpRgp ;    /* [I/-] RGB data */         unsigned char *   bpYuv[3] ; /* [I/-] YCbCr data */         unsigned char *   bpStream ; /* [I/-] Encoded data */     } data ; } _ELIB_IMG_ENCIMGDATAINFO ;  typedef struct tagELIB_IMG_ENCEXIFINFO {     char            cDummy[4] ;    /* [I/-] Reserved for Exif information specified from application*/                                 /*      Currently not used (Set 0.) */ } _ELIB_IMG_ENCEXIFINFO ;  /* Details of image data encode structure */ typedef struct tagELIB_IMG_ENCODEPARAM </pre> |        |                  |

```

{
 char cCompress ; /* [I/-] Encoding ratio (1 to 100) */
 unsigned char bThmb ; /* [I/-] Whether thumbnail is present (used only
for JPEG) */

 /* Set ELIB_IMG_THUMB_OFF. */
 unsigned char bFormat ; /* [I/-] Output coding format [JFIF] */
 /* ELIB_IMG_TYPE_JPEG_JFIF */
 _ELIB_IMG_ENCIMGDATAINFO tPrimary_In ; /* [I/-] Input main image data
information */
 _ELIB_IMG_ENCIMGDATAINFO tThumb_In ; /* [I/-] Input thumbnail data
information */

 /* Currently not used; set null. */
 _ELIB_IMG_ENCEXIFINFO * tpExifBuf ; /* [I/-] Exif information (IN) */
 /* Currently not used; set null pointer. */
 unsigned char bCopyRight ; /* [I/-] File restriction information */
 /* ELIB_IMG_COPY_NO: Restricted */
 /* ELIB_IMG_COPY_OK: Not restricted */
} _ELIB_IMG_ENCODEPARAM ;

/* Structure for storing encoded data */
typedef struct tagELIB_IMG_OUTDATA
{
 unsigned char * bpOutImgData ; /* [I/O] Pointer to storage area for output image data */
 /* *The high-order layer should allocate this area by generally specifying the
maximum size (20K bytes).*/
 /* For VGA image data, a 100K-byte area should be allocated.*/
 unsigned long dwOutImgLen ; /* [I/O] Size of storage area for output image data */
 /* IN: Set the size of storage area for output image data. */
 /* OUT: Store the size of encoded and output image data. */
} _ELIB_IMG_OUTDATA ;

/* Details of interface structure for high-order layer of JPEG encoder.
*/
typedef struct _ELIB_IMG_JPEGENCINFO
{
 _ELIB_IMG_ENCODEPARAM * ImgEncode_Param ; /* Pointer to storage area for
image data encode structure */
 unsigned char * outinf ; /* Pointer to output information *Used in encoder */
 /* *Set pointer to area allocated with size (30 bytes) set in
ELIB_IMG_OUTINF_SIZE.*/
 unsigned char * workbuf ; /* Pointer to storage area for encode work
information *Used in encoder */
 /* *Set pointer to area allocated with size (650,000 bytes)
set in ELIB_IMG_WORKBUF_SIZE.*/
} _ELIB_IMG_JPEGENCINFO ;

```

|                     |                                                                                                                                                                                                                                       |     |                                                                                                        |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|--------------------------------------------------------------------------------------------------------|
| Include file        | srv_img.h                                                                                                                                                                                                                             |     |                                                                                                        |
| Calling sequence    | <pre>int      Elib_IMG_Encode2(      unsigned      int      Ap_ID,       _ELIB_IMG_JPEGENCINFO *ImgEncode,       _ELIB_IMG_OUTDATA * OutData);</pre>                                                                                  |     |                                                                                                        |
| Argument            | Type                                                                                                                                                                                                                                  | I/O | Description                                                                                            |
| Ap_ID               | unsigned int                                                                                                                                                                                                                          | I   | Application ID                                                                                         |
| ImgEncode           | _ELIB_IMG_JPEGENCINFO *                                                                                                                                                                                                               | I   | Pointer to storage area for JPEG encoder structure                                                     |
| OutData             | _ELIB_IMG_OUTDATA *                                                                                                                                                                                                                   | I/O | Pointer to storage structure area for output image data                                                |
| Return value        | Type                                                                                                                                                                                                                                  | -   | Description                                                                                            |
| ret                 | int                                                                                                                                                                                                                                   | O   | Normal end      ELIB_IMG_OK<br>Abnormal end      ELIB_IMG_NG<br>Parameter error      ELIB_IMG_PARAM_NG |
| Necessary procedure |                                                                                                                                                                                                                                       |     |                                                                                                        |
| Note/Prohibition    | 1. The high-order layer should allocate an area to store output image data.<br>2. The high-order layer should allocate areas to store output information data and encode work information data in the ELIB_IMG_JPEGENCINFO structure. |     |                                                                                                        |
| Remarks             |                                                                                                                                                                                                                                       |     |                                                                                                        |

## 3.13 Image data editing (composite, expansion/reduction)

| Classification   | Image library support function                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |        |                                                                                                                                                                                  |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Function         | Image data editing (composite, expansion/reduction)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Symbol | Elib_IMG_EditData                                                                                                                                                                |
| Overview         | <ul style="list-style-type: none"> <li>- This function edits data in the editing target image structure and editing frame image structure according to editing type data set in the editing set parameter structure, and stores the data in the output image structure.</li> <li>- If a specified dynamic image control color is used in the processed image, this function replaces it with a control color specified for replacement.</li> <li>- If size modification is specified in the kind member in the editing set parameter information structure (_ELIB_IMG_IMGEDITPARAM), this function expands or reduces target image data.</li> </ul> |        |                                                                                                                                                                                  |
| Include file     | srv_img.h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |        |                                                                                                                                                                                  |
| Calling sequence | <pre>int Elib_IMG_EditData (unsigned int Ap_ID,                       _ELIB_IMG_EDITIMAGEINFO * Input1,                       _ELIB_IMG_EDITIMAGEINFO * Input2,                       _ELIB_IMG_EDITIMAGEINFO * Output,                       _ELIB_IMG_IMGEDITPARAM * Edit_param) ;</pre>                                                                                                                                                                                                                                                                                                                                                          |        |                                                                                                                                                                                  |
| Argument         | Type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | I/O    | Description                                                                                                                                                                      |
| Ap_ID            | unsigned int                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | I      | Application ID                                                                                                                                                                   |
| Input1           | _ELIB_IMG_EDITIMAGEINFO *                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | I      | Pointer to editing target image structure                                                                                                                                        |
| Input2           | _ELIB_IMG_EDITIMAGEINFO *                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | I      | Pointer to editing frame image structure<br>Set this pointer only when frame composite is specified as editing type; set null in other cases.                                    |
| Output           | _ELIB_IMG_EDITIMAGEINFO *                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | I/O    | Pointer to output image structure<br>The high-order layer should allocate the output data area.<br>A size must be obtained by multiplying height, width, and 2 (bytes) together. |
| Edit_param       | _ELIB_IMG_IMGEDITPARAM *                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | I      | Pointer to editing set parameter information structure                                                                                                                           |
| Return value     | Type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | -      | Description                                                                                                                                                                      |
| ret              | Int                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | O      | Normal end      ELIB_IMG_OK<br>Abnormal end      ELIB_IMG_NG<br>Parameter error      ELIB_IMG_PARAM_NG                                                                           |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |  |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |  |  |
| Necessary procedure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |  |  |
| Note/Prohibition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |  |  |
| Remarks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |  |
| <pre>/* Details of image editing information structure */ typedef struct tagELIB_IMG_EDITIMAGEINFO {     unsigned char *ImageData_p; /* Image data pointer */         /* Sets a size obtained by multiplying output image height, width, and 2 (bytes)         together in argument Output. */     unsigned int  ImageSizeX; /* Width (1 to 640)          */         /* To change the width, set original width in argument Input1 and new width in         argument Output.*/     unsigned int  ImageSizeY; /* Height (1 to 480) */         /* To change the height, set original height in argument Input1 and new height in         argument Output.*/     char          ImageType; /* Image type (fixed to RGB565) */     char          direction_x; /* Processing direction (whether to apply horizontal inversion)     /**/ Not used */     char          direction_y; /* Processing direction (whether to apply vertical inversion) */     Not used */     char          TransClrNum; /* Number of transparent colors. When two or more colors         are to be assumed transparent, set the number of colors.         Generally set 1 in other cases. */         /* Set 0 for other than composite. */     unsigned long TransClr[2]; /* Transparent color value (This can be freely set.) */         /* Set 0 for other than composite. */ } _ELIB_IMG_EDITIMAGEINFO  /* Details of frame composite information structure */ typedef struct tagELIB_IMG_EDITPARAM_FRAME {     int          frame_startX; /* X coordinate of frame overlap position */     int          frame_startY; /* Y coordinate of frame overlap position */ } _ELIB_IMG_EDITPARAM_FRAME;  /* Wave effect information structure */ typedef struct tagELIB_IMG_EDITPARAM_WAVE {     unsigned short wave_amplitude;     unsigned short wave_period;     unsigned short wave_offset;     unsigned short wave_direction; } ELIB_IMG_EDITPARAM_WAVE;</pre> |  |  |  |

```

/* Sepia tone effect information structure */
typedef struct tagELIB_IMG_EDITPARAM_SEPIA
{
 unsigned char sepia_uv[2];
} _ELIB_IMG_EDITPARAM_SEPIA;

/* Animation style effect information structure */
typedef struct tagELIB_IMG_EDITPARAM_ANIME
{
 short filter[9];
 unsigned char anime_bias;
} _ELIB_IMG_EDITPARAM_ANIME;

/* Details of editing parameter information structure */
typedef union tagELIB_IMG_EDITPARAM
{
 _ELIB_IMG_EDITPARAM_FRAME frame; /* Frame information */
 _ELIB_IMG_EDITPARAM_WAVE wave; /* Wave effect information (not used) */
 _ELIB_IMG_EDITPARAM_SEPIA sepia; /* Sepia tone effect information (not
used) */
 _ELIB_IMG_EDITPARAM_ANIME anime; /* Animation style effect information
(not used) */
} _ELIB_IMG_EDITPARAM;

/* Details of editing set parameter information structure */
typedef struct _ELIB_IMG_IMGEDITPARAM
{
 _ELIB_IMG_EDITPARAM param; /* Parameter information */
 /* Set null for other than composite */
 int kind; /* Editing type */
 /* Frame composite :ELIB_IMG_EDITKIND_FRAME */
 /* Size modification
(expansion/reduction) :ELIB_IMG_EDITKIND_SIZING */
} _ELIB_IMG_IMGEDITPARAM;

```

## 3.14 Image data editing (clipping, rotation, inversion)

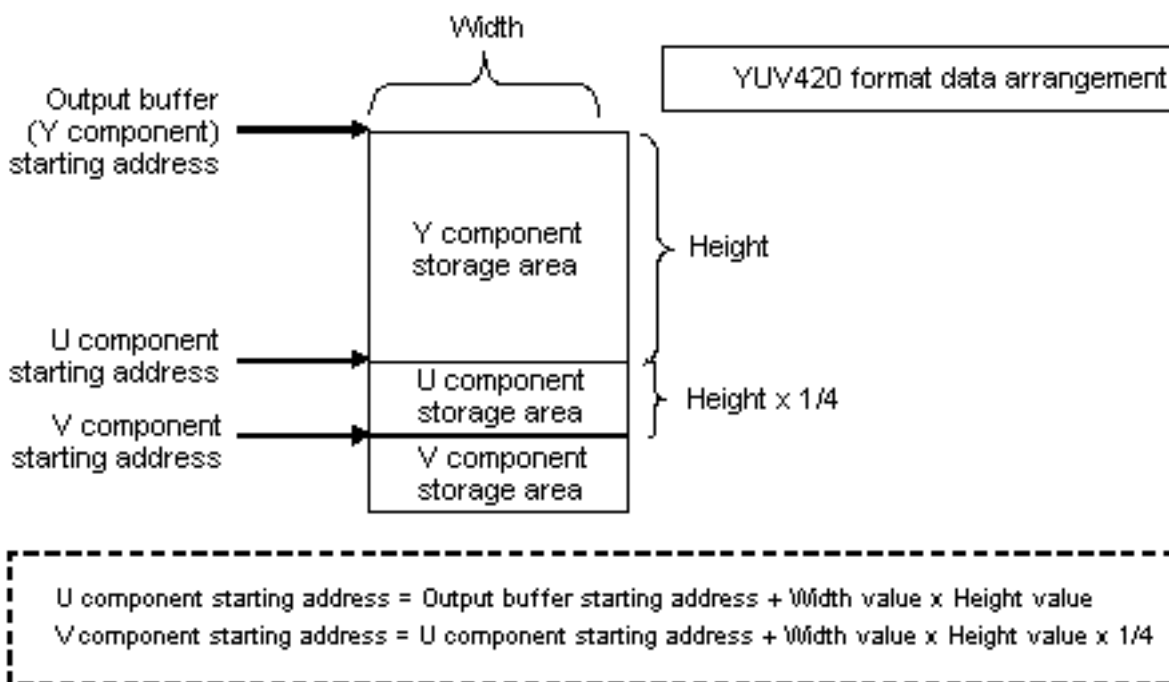
|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |        |                      |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|----------------------|
| Classification | Image library support function                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                      |
| Function       | Image data editing request (clipping, rotation, inversion)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Symbol | Elib_IMG_CompileData |
| Overview       | <p>This function edits RGB565 image data (16-bit BMP format) with one of the following specified methods:</p> <ol style="list-style-type: none"> <li>(1) Data in a specified range is clipped.</li> <li>(2) Data is rotated by 90, 180, or 270°.</li> <li>(3) Data is inverted vertically or horizontally.</li> </ol> <p>[Image process-editing information structure]</p> <pre>typedef struct tagELIB_IMG_COMPILE_INFO {     unsigned char *   pInputData ;    /* [I/-] Pointer to input image data */     unsigned short    Width ;         /* [I/-] Width of input image */     unsigned short     Height ;       /* [I/-] Height of input image*/     unsigned char *   pOutputData ;   /* [I/O] Pointer to output image data */                                 /* &lt;When clipping is specified as processing mode&gt; */                                 /* Set a buffer with size obtained by multiplying clipping width, height, and 2 together. */                                 /* &lt;When rotation or inversion is specified as processing mode&gt; */                                 /* Set a buffer with size obtained by multiplying the width, height, and 2 together. */     unsigned short    ClipStartX ;    /* [I/-] X coordinate of clipping start position*1 */     unsigned short    ClipStartY ;    /* [I/-] Y coordinate of clipping start position*1 */     unsigned short    ClipWidth ;     /* [I/-] Clipping width* */     unsigned short    ClipHeight ;    /* [I/-] Clipping height*1 */     unsigned char     CompMode ;      /* [I/-] Editing mode */                                 /* &lt;When clipping is specified as processing mode&gt; */                                 /* Not used */                                 /* &lt;When rotation is specified as processing mode&gt; */                                 /* ELIB_IMG_COMP_TURN_090: Rotation by 90° */                                 /* ELIB_IMG_COMP_TURN_180: Rotation by 180° */                                 /* ELIB_IMG_COMP_TURN_270: Rotation by 270° */                                 /* &lt;When inversion is specified as processing mode&gt; */                                 /* ELIB_IMG_COMP_FLIP_UD: Vertical inversion */                                 /* ELIB_IMG_COMP_FLIP_RL: Horizontal inversion */ } _ELIB_IMG_COMPILE_INFO ;</pre> <p>*1 - Member valid only for clipping (when clipping is specified as processing mode). This member is ignored for other processing modes.</p> |        |                      |

| <ul style="list-style-type: none"> <li>- The clipping position and size should satisfy the following conditions:<br/> ClipStartX + ClipWidth &lt;= Width<br/> ClipStartY + ClipHeight &lt;= Height</li> </ul> |                                                                                                  |     |                                                                                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------------------------------------------------------------|
| Include file                                                                                                                                                                                                  | srv_img.h                                                                                        |     |                                                                                                                                 |
| Calling sequence                                                                                                                                                                                              | int Elib_IMG_CompiledData(unsigned int Ap_ID, int TreatMode, _ELIB_IMG_COMPILE_INFO *pImgData) ; |     |                                                                                                                                 |
| Argument                                                                                                                                                                                                      | Type                                                                                             | I/O | Description                                                                                                                     |
| Ap_ID                                                                                                                                                                                                         | unsigned int                                                                                     | I   | Application ID                                                                                                                  |
| TreatMode                                                                                                                                                                                                     | Int                                                                                              | I   | Processing mode<br>(1) ELIB_IMG_TREAT_CLIP: Clipping<br>(2) ELIB_IMG_TREAT_TURN: Rotation<br>(3) ELIB_IMG_TREAT_FLIP: Inversion |
| pImgData                                                                                                                                                                                                      | _ELIB_IMG_COMPILE_INFO *                                                                         | I/O | Pointer to image process-editing information structure<br>*See "Overview."                                                      |
| Return value                                                                                                                                                                                                  | Type                                                                                             | -   | Description                                                                                                                     |
| ret                                                                                                                                                                                                           | Int                                                                                              | O   | ELIB_IMG_OK: Normal end<br>ELIB_IMG_NG: Abnormal end<br>ELIB_IMG_PARAM_NG: Parameter error                                      |
| Necessary procedure                                                                                                                                                                                           |                                                                                                  |     |                                                                                                                                 |
| Note/Prohibition                                                                                                                                                                                              | The high-order layer should allocate areas for input-output image data.                          |     |                                                                                                                                 |
| Remarks                                                                                                                                                                                                       |                                                                                                  |     |                                                                                                                                 |



## 3.15 Image data format conversion

|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                      |
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| Classification | Image library support function                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |        |                      |
| Function       | Image data format conversion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Symbol | Elib_IMG_DataConvert |
| Overview       | <p>- This function converts data between YUV422/YUV420 format and RGB565 format.</p> <p>- This function also converts RGB565 format to YUV420 format.</p> <p>*YUV422 format data is arrayed in order of V0, Y1, U0, Y0, V1, Y3, U1, and Y2.</p> <p>*For YUV420 format data arrangement, see "Remarks."</p> <p>- When YUV420 format is to be converted to RGB565 format with one buffer, specify ELIB_IMG_INPUTBUFFER in member DrawType.</p> <p>/* Pointer to storage area for image data format conversion information structure */</p> <pre>typedef struct tagELIB_IMG_CONVERT_INFO {     unsigned char DrawType; /* [I/-] Drawing type */ *1         /* For output to buffer specified in InputData:ELIB_IMG_INPUTBUFFER */         /* For output to buffer specified in OutputDat:ELIB_IMG_OUTPUTBUFFER */     unsigned char ConvertType; /* [I/-] Conversion type*/         /* YUV422 to RGB565: Set ELIB_IMG_YUV422TORGB565.*/         /* RGB565 to YUV422: Set ELIB_IMG_RGB565TOYUV422.*/         /* RGB565 to YUV420: Set ELIB_IMG_RGB565TOYUV420.*/         /* YUV420 to RGB565: Set ELIB_IMG_YUV420TORGB565.*/     unsigned short Width; /* [I/-] Width (2 to 640)*/ *2     unsigned short Height; /* [I/-] Height (1 to 480)*/ *3     unsigned char *InputData; /* [I/O] Data buffer before conversion*/ *4     unsigned char *OutputData; /* [-/O] Data buffer after conversion*/ *5 } _ELIB_IMG_CONVERT_INFO;</pre> <p>*1 For conversion from RGB565 to YUV420 or vice versa, only ELIB_IMG_OUTPUTBUFFER can be set in member DrawType.<br/>For conversion from YUV422 to RGB565 or vice versa, ELIB_IMG_INPUTBUFFER and ELIB_IMG_OUTPUTBUFFER can be set in member DrawType.</p> <p>*2 Specify an even number for the width of a conversion target image. Specifying an odd number returns a parameter error.</p> <p>*3 For conversion from RGB565 to YUV420 or vice versa, specify even numbers for the width and height of a conversion target image. Specifying an odd number returns a parameter error.</p> <p>*4 If ELIB_IMG_INPUTBUFFER is specified in member DrawType for conversion from YUV422 to RGB565 or vice versa, converted data is overwritten in a buffer specified in member InputData.</p> <p>*5 The main application should allocate a buffer with a size obtained by multiplying the width, height, and 2 (16 bits) together.<br/>For conversion from RGB565 to YUV420, the main application should allocate an area with a size obtained by multiplying the width, height, and 3/2 (12 bits) together.<br/>If ELIB_IMG_INPUTBUFFER is specified in member DrawType for conversion from YUV422 to RGB565 or vice versa, set null in member OutputData.</p> |        |                      |

| Include file        | srv_img.h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |     |                                                                                                   |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------------------------------|
| Calling sequence    | int Elib_IMG_DataConvert( unsigned int Ap_ID, _ELIB_IMG_CONVERT_INFO * ImgConvert );                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |     |                                                                                                   |
| Argument            | Type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | I/O | Description                                                                                       |
| Ap_ID               | unsigned int                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | I   | Application ID                                                                                    |
| ImgConvert          | _ELIB_IMG_CONVERT_INFO *                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | I/O | Pointer to storage area for image data format conversion information structure                    |
| Return value        | Type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | -   | Description                                                                                       |
| Ret                 | Int                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | O   | Normal end      ELIB_IMG_OK<br>Abnormal end    ELIB_IMG_NG<br>Parameter error   ELIB_IMG_PARAM_NG |
| Necessary procedure |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |     |                                                                                                   |
| Note/Prohibition    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |     |                                                                                                   |
| Remarks             |  <p>YUV420 format data arrangement</p> <p>Output buffer (Y component) starting address →</p> <p>U component starting address →</p> <p>V component starting address →</p> <p>Y component storage area</p> <p>U component storage area</p> <p>V component storage area</p> <p>Width</p> <p>Height</p> <p>Height x 1/4</p> <p>U component starting address = Output buffer starting address + Width value x Height value</p> <p>V component starting address = U component starting address + Width value x Height value x 1/4</p> |     |                                                                                                   |

## 3.16 Static image control event report request

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| Classification | Image library support function                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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| Function       | Static image control event report request                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             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| Overview       | <div><div><div><div><div><div></div><div></div><div></div></div><div><div></div><div></div><div></div></div><div><div></div><div></div><div></div></div></div><div><div></div><div></div><div></div></div><div><div></div><div></div><div></div></div></div><div><div></div><div></div><div></div></div><div><div></div><div></div><div></div></div><div><div></div><div></div><div></div></div></div><div><div></div><div></div><div></div></div><div><div></div><div></div><div></div></div><div><div></div><div></div><div></div></div></div> <div><div></div><div></div><div></div></div> <div><div></div><div></div><div></div></div> <div><div></div><div></div><div></div></div> <div><div></div><div></div><div></div></div> <div><div></div><div></div><div></div></div> <div><div></div><div></div><div></div></div> <div><div></div><div></div><div></div></div> <div><div></div><div></div><div></div></div> <div><div></div><div></div><div></div></div> <div><div></div><div></div><div></div></div> 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|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------------------------------------------------------------------------------|
| event               | int                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | I | Event for which report is to be requested<br>*See event list in "Overview."                     |
| func                | MsbFunc                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | I | Pointer to function to be called back for an event.<br>*See "Overview."                         |
| Return value        | Type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | - | Description                                                                                     |
| Ret                 | int                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | O | Normal end      ELIB_IMG_OK<br>Abnormal end    ELIB_IMG_NG<br>Parameter error ELIB_IMG_PARAM_NG |
| Necessary procedure |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |   |                                                                                                 |
| Note/Prohibition    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |   |                                                                                                 |
| Remarks             | <p>Use MSB to report an event.</p> <p>A function specified in the func argument with an event report request (Elib_IMG_Request) is called back to make an event report.</p> <p>Functions that called back void func (MsbObject *client, MsbObject *server, void *eventData,</p> <p style="text-align: right;">void *retData, void *data,</p> <p>MsbEnvironment *ev) ;</p> <p>*Null is always stored as retData and data values.</p> <p>An exception sent from MSB is stored in ev.</p> <p>When an event is reported (i.e., specified function called back), event information is stored in (_ELIB_IMG_EVENT *)eventData and each data item can be accessed as follows:</p> <pre> Category = ((_ELIB_IMG_EVENT *)eventData)-&gt;category ; Subtype  = ((_ELIB_IMG_EVENT *)eventData)-&gt;subtype ; Info     = ((_ELIB_IMG_EVENT *)eventData)-&gt;info ; Subinfo  = ((_ELIB_IMG_EVENT *)eventData)-&gt;subinfo ; Data     = ((_ELIB_IMG_EVENT *)eventData)-&gt;data ; </pre> <p>* The structural format of _ELIB_IMG_EVENT is shown below.</p> <pre> typedef struct tag_ELIB_IMG_EVENT {     int category ;      /* Category*/     int subtype  ;      /* Subtype*/     int info    ;      /* Information attached to event 1*/     int subinfo ;      /* Information attached to event 2*/     int data    ;      /* Data*/ } _ELIB_IMG_EVENT; </pre> |   |                                                                                                 |

## 3.17 Static image control event report cancel

| Classification      | Image library support function                                                                                                                                                                                          |        |                                                                                                                      |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|----------------------------------------------------------------------------------------------------------------------|
| Function            | Static image control event report cancel                                                                                                                                                                                | Symbol | Elib_IMG_Cancel                                                                                                      |
| Overview            | <p>This function cancels an event report registered with the static image control event report request function (B-1).</p> <p>*If an unregistered event report is canceled, ELIB_IMG_NG (abnormal end) is returned.</p> |        |                                                                                                                      |
| Include file        | srv_img.h                                                                                                                                                                                                               |        |                                                                                                                      |
| Calling sequence    | int Elib_IMG_Cancel ( unsigned int Ap_ID , int event );                                                                                                                                                                 |        |                                                                                                                      |
| Argument            | Type                                                                                                                                                                                                                    | I/O    | Description                                                                                                          |
| Ap_ID               | unsigned int                                                                                                                                                                                                            | I      | Application ID                                                                                                       |
| event               | int                                                                                                                                                                                                                     | I      | Event for which report is to be canceled<br>*See event argument of static image control event report function (B-1). |
| Return value        | Type                                                                                                                                                                                                                    | -      | Description                                                                                                          |
| Ret                 | int                                                                                                                                                                                                                     | O      | Normal end      ELIB_IMG_OK<br>Abnormal end    ELIB_IMG_NG<br>Parameter error ELIB_IMG_PARAM_NG                      |
| Necessary procedure |                                                                                                                                                                                                                         |        |                                                                                                                      |
| Note/Prohibition    |                                                                                                                                                                                                                         |        |                                                                                                                      |
| Remarks             |                                                                                                                                                                                                                         |        |                                                                                                                      |